Electric Heat Is Competitive . . . 110

Teach Contractors to Sell It . . . 112

Everything From Electronics to Fringes 137

Getting Profits From Playgrounds 141

ELECTRICAL WEST

August 1957
25 Cents

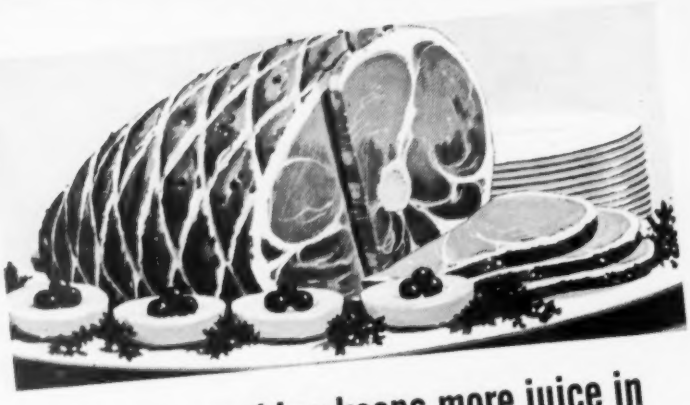
SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

A Short Course in Dam Building 106

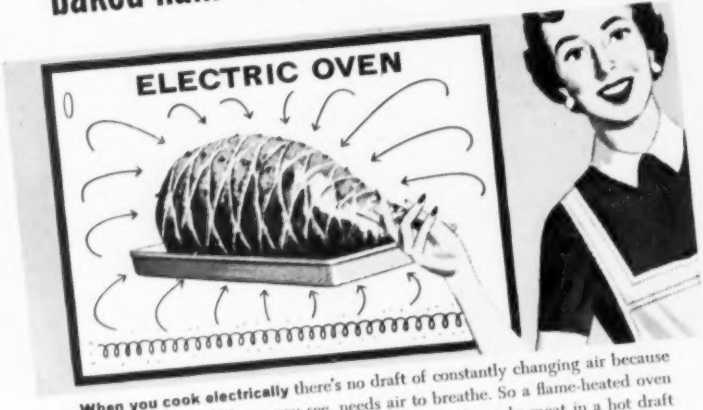
Try a New Approach 95
Substation Control Cables 103
Water for Building Load 108
Hot Wires Do the Darnedest Things 117
Here's How Joint Industry Board Works 122
Power for Metal Craft 124

These Are the Facts! . . . 98

Edison
is selling the
advantages
of electric cooking—
to boost your
electric range
sales



Electric cooking keeps more juice in baked ham—*because it's flameless!*



When you cook electrically there's no draft of constantly changing air because there's no flame. (Flame, you see, needs air to breathe. So a flame-heated oven constantly inhales dry air, exhales moist air—literally cooks meat in a hot draft that evaporates good juices.) In an electric oven there's no draft of dry air. You cook with moist heat. As a result, more juice stays in the meat . . . and the meat tastes better.

Electric cooking is far cooler, too. As much as 16° cooler. The reason is obvious: electric cooking puts the heat directly into the food, not into the room. Electric cooking is cleaner, too, because it's flameless. There are no by-products of combustion to dirty walls and darken your bright pans. Truly, it's the *only modern way* to cook. Why not see your appliance dealer for a demonstration of the new electric ranges?

SOUTHERN CALIFORNIA Edison COMPANY

LIVE BETTER—ELECTRICALLY!

Did you know? Flameless electric cooking costs about $1.50 a month for a family of 4

600 FIXTURES INSTALLED IN 1 DAY

...proves SMOOT-HOLMAN Luminaires go up faster...easier

In a recent West Coast installation, 30 men installed 600 Smoot-Holman Industrial Luminaires in a single day. An amazing accomplishment, possible with the **unique design features** of Smoot-Holman fixtures. Faster installation and easier maintenance saves time and money. This economy comes from quality Smoot-Holman fixtures to benefit architect, contractor and customer.

For complete information on the rugged D-284 Industrial and other Smoot-Holman fixtures, call our nearest representative. Learn how you, too, can get more for your money from Smoot-Holman.

SMOOT-HOLMAN INGLEWOOD, CALIFORNIA

We support the National Lighting Bureau

service in the west and southwest for all school, commercial and industrial lighting

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas," & "Journal of Electricity." Contents copyright. Seventy-first year of publication.

George C. Tenney, Publisher
C. W. Leihy, Editor
W. A. Cyr, Consulting Editor
Peggy Boyer, Associate Editor
Jack Robinson, Engineering Editor
Dale VanHorn, News Editor
Miriam Stuart, Editorial Assistant

Regional Editors
Frank Pitman, Intermountain
Barbara Bidwell, Pacific Southwest
Berkeley Snow, Pacific Northwest

CONTENTS

VOL. 119 NO. 2 AUGUST 1957

Try a New Approach by A. R. Woolley 95
These Are the Facts! by T. E. Roach 98

ENGINEERING

Will it Relay—Reliably? by C. G. McKee and W. E. Sutter 100
Substation Control Cables by E. C. Neff 103
A Short Course in Dam Building 106

MARKET DEVELOPMENT

Electric Heat Is Competitive 110
Teach Contractors to Sell It 112
Runs Its Own Heat Drive 114

LIGHTING AND WIRING

Hot Wires Do the Darnedest Things by Tom Hughes 117
Here's How Joint Industry Board Works 122

ASSOCIATIONS

Everything From Electronics to Fringes 137

DEPARTMENTS

Bulletins	31	News	151
Contractors' News Letter	125	News Roundup	8
Editorials	85, 92	Profiles	168
Electra's Husband	90	Regional Roundup	15
How're We Doing?	6	Sales Guide News Letter	33
New Products	21	Advertising Index	168

Next Month

Lighting in the West will be beamed to you from about every page and these beams will bring to view new trends and new techniques. The first high-frequency, high-voltage job in the West at University of New Mexico will introduce new and better means to light large areas from high mountings. Lighting the Disneyland plastic house will preview future residential trends.

ADVERTISING REPRESENTATIVES

Atlanta (3) ..... Robert Powell, Rhodes Haverty Bldg.
Chicago (11) ..... Michael I. O'Connell, 520 N. Michigan Ave.
Cleveland (15) ..... Frank Seiler, R. A. Hubley, 1510 Hanna Bldg., Superior 1-7000
Denver (2) ..... John Patten, 1740 Broadway, AL 5-2981
Los Angeles (17) ..... Russ Antles, 1125 West 6th St., MA 6-9351
New York (36) ..... G. W. Simpson, 500 Fifth Ave.
San Francisco (4) ..... James Dickerson, Dick Alcorn, 68 Post St., DO 2-4600
T. H. Carmody, Advertising Sales Manager
Bernice Johnston, Advertising Production Manager

Offices: Atlanta, Boston, Dallas, Detroit, Philadelphia, Pittsburgh, St. Louis

Electrical West (with which is consolidated The Journal of Electricity). August 1957, Vol. 119, No. 2. Published monthly by McGraw-Hill Company of California, James H. McGraw (1860-1948) Founder. Office of publication, 235 N. W. Park Ave., Portland 9, Ore. See panel below for directions regarding subscriptions or change of address.

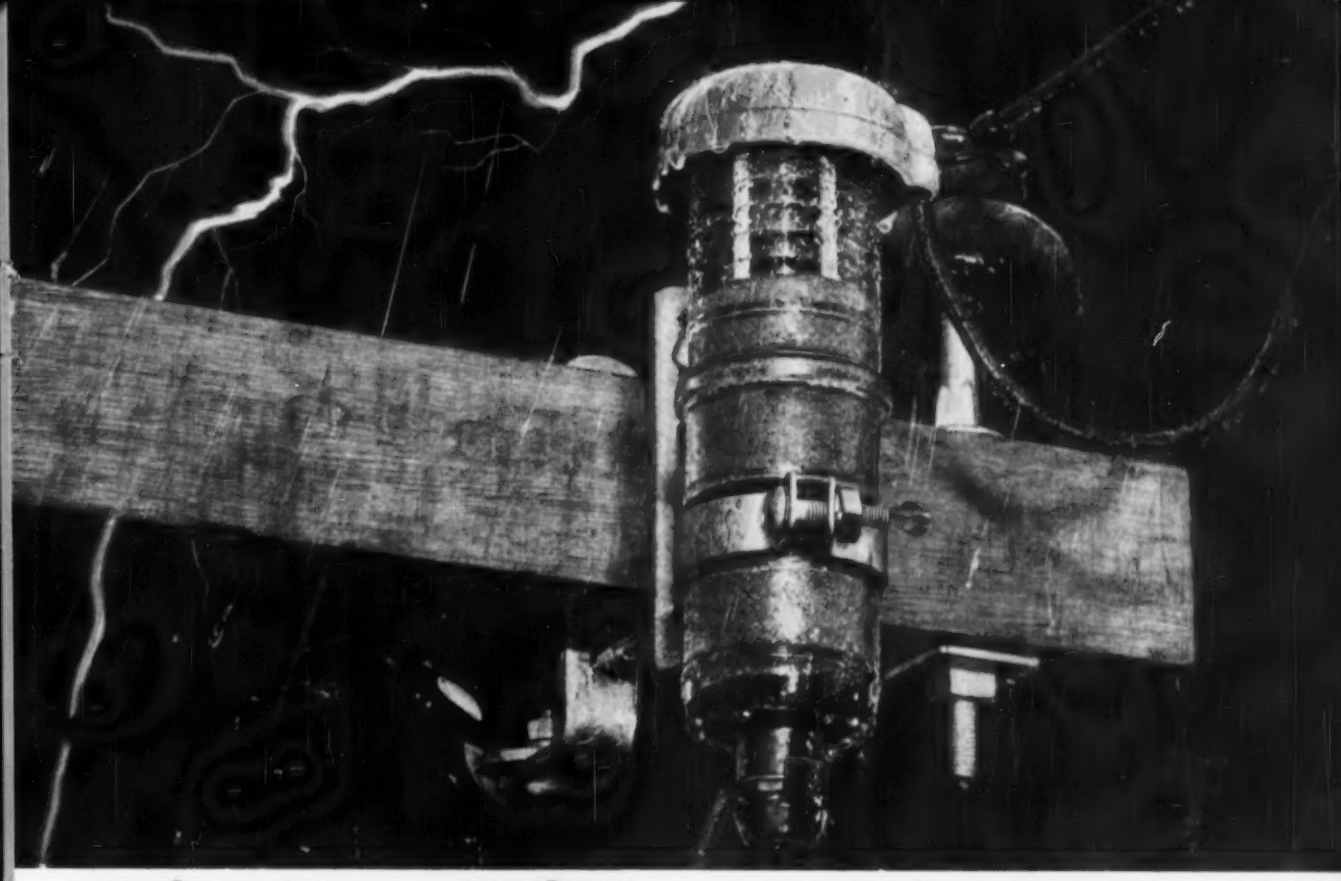
Executive, editorial, circulation and advertising offices: 68 Post St., San Francisco 4, Calif. Donald C. McGraw, chairman of the board; George C. Tenney, president; John W. Otterson, vice-president; B. M. Boccoli, secretary and treasurer.

Position and company connection must be indicated on subscription orders. Send to address shown in panel below. United States subscription rate $2 a year, single copies 25c (November directory issue $1). Latin American Republics $2 a year; Canada $2.50 a year; all other countries $3 a year. Entered as second class matter, Dec. 17, 1956, at the post office at Portland, Ore., under the act of March 3, 1879. Printed in U.S.A. Title registered in U. S. Patent Office.

© Copyrighted 1957, McGraw-Hill Company of California.

SUBSCRIPTIONS: Send subscription correspondence and change of address to Subscription Manager, Electrical West, 68 Post St. San Francisco 4, Calif. Allow 30 days for change of address.

Postmaster: please send notice 3579 to Electrical West, 68 Post St., San Francisco 4, Calif.



Why More Utilities Are Selecting L-M Type E Valve Arresters

L-M valve-type distribution lightning arresters have established an outstanding performance record by giving millions of service years of reliable protection. The Type E has been a leader in the field, and hundreds of thousands have been giving excellent service for many years. The failure rate is phenomenally low.

Here are some of the reasons for this remarkable record, and for the great increase in customer preference for the L-M Type E valve arrester.

Balanced Sparkover: Spark gap is a ladder-gap design, pre-set and then permanently sealed in the arrester housing. It cannot be knocked or burned out of adjustment. Gap is precision-made to assure optimum balance between 60-cycle sparkover and impulse sparkover.

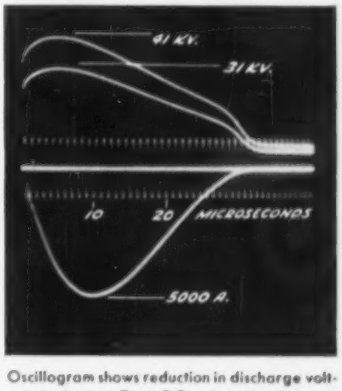
Low IR Drop: L-M now has a new Type E arrester, the E-3, which provides even lower IR drop than its popular predecessor. The new Type E-3 also provides greater durability and discharge capacity. These advantages are made possible because the new Type E-3 has an improved gap which provides greater 60-cycle interrupting ability, permitting reduction of the resistance of the valve element. The oscillogram shows the improvement in IR drop between the Type E and the new Type E-3.

Positive Protection: L-M valve arresters have a Pyrex glass housing which permits visual inspection of the spark gap in the field. Should the arrester become damaged, telltale evidence can be readily seen through the glass. If the arrester should fail to interrupt 60-cycle follow current for any reason whatsoever, L-M's patented Isolator provides positive assurance against grounding the feeder by disconnecting the ground lead from the arrester.

Other features include Zincilated (Zincilate No. 100) arrester housing clamp, fibre-glass cap, and fibre-form packaging. New packaging provides additional strength to the carton so arresters can be stacked easily on pallets.

Get Complete Information

Get the whole story of L-M arrester performance and application. Ask the L-M Field Engineer, or write for a copy of bulletin on the new Type E-3 arrester, to Line Material Industries, Milwaukee 1, Wisconsin.



Oscillogram shows reduction in discharge voltage in the new Type E-3 valve-type lightning arrester. Curves are for a 9 kv unit. IR drop has been reduced from 41 kv to 31 kv—a remarkable improvement in a unit that already has established an enviable performance record over many years' service.

LINE MATERIAL Industries

McGRAW-EDISON COMPANY

LM Lightning Arresters

McGRAW EDISON

Save $2920*

New APT high-voltage potential transformer . . .

greater metering accuracy, 50% more thermal capacity than other low-cost designs

The new Westinghouse Type APT potential transformer is designed for low-cost, positive protection and highly accurate metering. Its single-core-and-coil, single-bushing design holds the edge over both the conventional type and other low-cost designs.

Greater metering accuracy—This new transformer, 92-161 kv meets ASA 0.3 accuracy standards on burdens up to 500 volt-amperes; and, as shown in the graphs below, at 200 volt-amperes burden both its ratio correction factor and its phase angle deviation are only half as much as for other low-cost designs. This means more accurate metering under all conditions.

Higher thermal rating—The Type APT transformer at 115 kv, for instance, has a minimum thermal rating of 6000 volt-amperes.

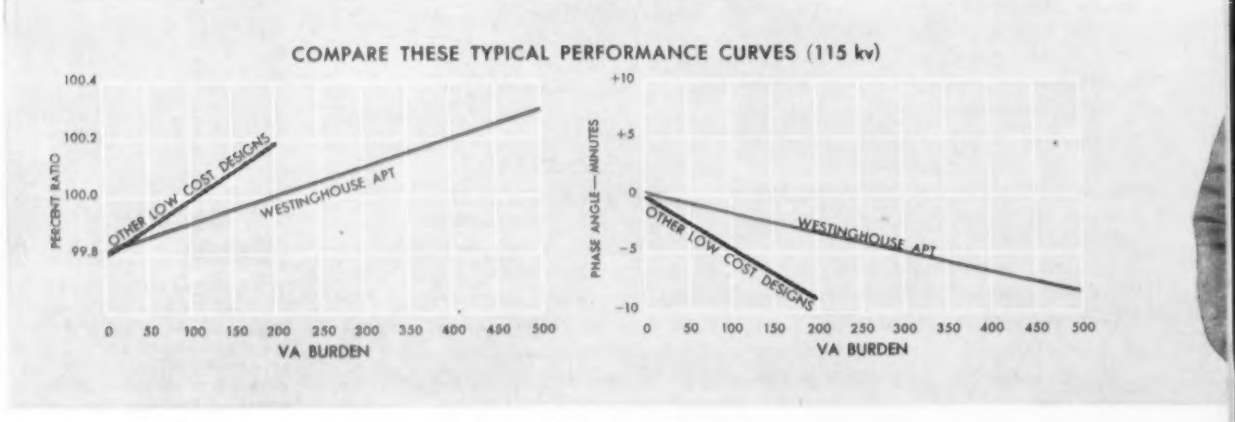
ASA Group 3 insulation—Designed for line-to-neutral operation, the APT utilizes Hipersil® cores fluxed for line-to-line voltage under emergency operating conditions.

Reduced size and weight—Solid insulation and exclusive Hipersil cores combine maximum performance characteristics with minimum size and weight.

For the full story of the performance of the Type APT transformer, call your Westinghouse representative . . . or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

*On a 138 kv APT potential transformer J-70818

YOU CAN BE SURE...IF IT'S Westinghouse



Lower percent ratio error and smaller phase angle deviation of new Westinghouse APT potential transformer contribute to substantially improved metering accuracy.

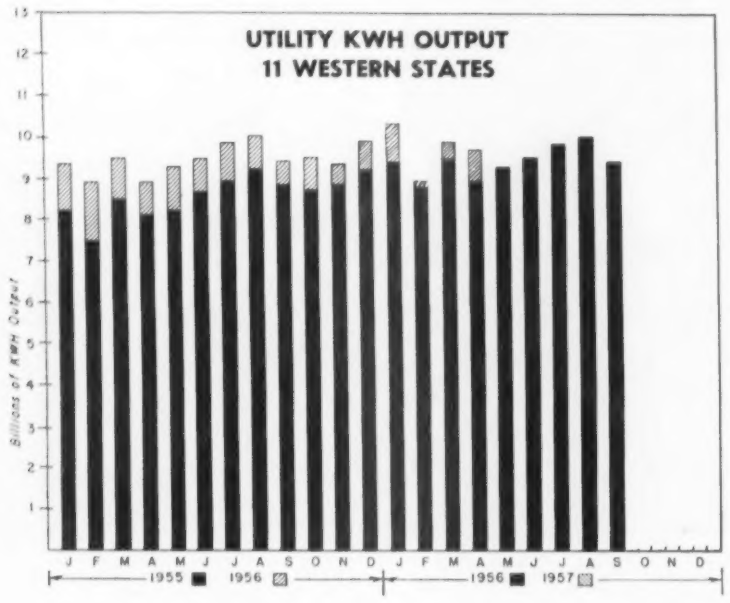
45% savings

New Type APT potential transformer, available in voltage classes from 92 through 138 kv, meets all ASA standards for high-voltage metering and relaying applications, and offers the following savings:

ESTIMATED NET PRICE COMPARISON

Insulation Class	BIL kv	Conventional Design	Westinghouse Type APT
92 kv	450	$4080	$2230
115	550	4930	2690
138	650	6460	3540
161	750	8110	4460

----How're We Doing?



Output Comparisons

Year-to-year Kwh Output Changes in Western Regions and U. S.
Percent Changes Over Same Week One Year Ago

Week Ending	Rocky Mountain	Pacific Southwest	Pacific Northwest	U. S. Total
June 8	+3.3	+10.2	+3.7	+5.5
June 15	+1.5	+ 6.3	+6.8	+4.7
June 22	+3.4	+11.0	+7.7	+7.5
June 29	+6.6	+10.8	+8.5	+5.3
July 6	+7.7	+13.5	+8.7	+6.4

PLANS FOR CAPITAL SPENDING *(Millions of Dollars)*

INDUSTRY	1956 Actual	1957 Planned	1956-1957 % Change	1958	1959	1960
				Preliminary Plans		
All Manufacturing	$12,787	$14,542	+14%	$12,390	$11,057	$10,601
Petroleum Industry	5,531	6,166	+11	6,421	6,276	6,081
Mining	443	474	+7	372	353	299
Railroads	1,231	1,366	+11	1,188	1,129	1,152
Other Transportation & Communications	4,229	4,963	+17	5,060	5,590	5,950
Electric & Gas Utilities	4,895	5,991	+22	5,880	5,238	5,113
Commercial	8,236	8,401	+2	8,065	7,178	6,317
ALL BUSINESS	36,641	40,979	+12%	38,397	35,911	34,767

McGraw-Hill's 10th annual business plans for new plant and equipment just completed by the Economics Department show electric and gas utilities capital expenditures leading the pack 22% over 1956. Projected expenditures through 1960 firm and probably low. Electrical machinery industrial capacity to increase 26% from 1957-60. Sales to increase for same period 22% on a physical volume base. Electrical industry anticipates 18% of 1960's product sales will be from products not available today. Supporting this contention, research expenditures up steadily with 1960 72% over 1955.

ELECTRICAL WEST'S
Editorial Advisory Board

Pacific Southwest Region

J. F. Davenport, Vice-President & General Manager
Southern California Edison Co., Los Angeles
R. H. Cockfield, Business Agent
Department of Water & Power, Los Angeles
Joseph Pengilly, Vice-President
Square D Co., Los Angeles
Leonard Hobbs, President
Smoot-Holman Co., Inglewood
Harry Gerster, Vice-President
General Electric Supply Co., Los Angeles
Sidney Hill
Hill Electric Co., Los Angeles
C. M. Smith, Sales Manager
Fluor Corp., Los Angeles
Victor Hartley, Managing Director
PCEA, Los Angeles

Northern California Region

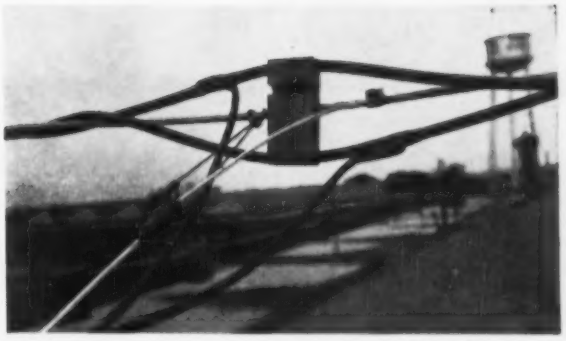
Walter Maytham, Vice-President
Westinghouse Electric Corp., San Francisco
Norman R. Sutherland, President
Pacific Gas & Electric Co., San Francisco
Fred Nicholas
F. M. Nicholas Co., San Francisco
Alfred H. Meyer, President
Leo J. Meyberg Co., San Francisco
Arthur Dahl, Sales Manager
General Electric Supply Co., San Francisco
Paul Churchill, Regional Manager
Line Material Industries, South San Francisco
George Abbett, President
Abbett Electric Co., San Francisco
Karl Bausch, Chief Electrical Engineer
Bechtel Corp., San Francisco
Frank Bagha
Bagha, Wier & Finato, San Francisco

Intermountain Region

Don Hitchcock, Manager
Graybar Electric Co., Denver
R. D. Moody, Manager
Allis-Chalmers Mfg. Co., Denver
David B. Hyer Jr., President
Southern Colorado Power Co., Pueblo
R. W. Akerlow
Stearns-Roger Mfg. Co., Denver
Don Larson, Mgr., Rocky Mt. Chapter
NECA, Denver
Ralph Johnson, Vice-President & General Manager
Sturgeon Electric Co., Denver
Ken G. Eaton, District Manager
Anaconda Wire & Cable Co., Denver
Howard Peterson
Peterson Co., Denver
Ralph Hubbard, Managing Director
RMEL, Denver
W. W. Bowman, Director of Publicity
Utah Power & Light Co., Salt Lake City
A. E. Fleming, District Manager
General Electric Supply Co., Salt Lake City
John Kimball, Vice-President & General Manager
Idaho Power Co., Boise

Pacific Northwest Region

Eric Nelson
Shaffer & Nelson, Seattle
Charles C. Cutter, Northwest Representative
Federal Pacific Electric Co., Seattle
Ralph James
Northwestern Agencies, Seattle
R. B. Lane, President
Industrial Electric Co., Seattle
Beverly Travis, Consulting Engineer
Seattle
Eugene Starr, Chief Engineer
Bonneville Power Administration, Portland
Thomas W. Delzell, Chairman of Board
Portland General Electric Co., Portland
D. R. McClung, Executive Vice-President
Pacific Power & Light Co., Portland
James F. Grieve, Vice-President
C. C. Moore, Engineers, Portland
Max Wood
Schwager-Wood Co., Portland
Larry Rodgers, Manager
Oregon-Columbia Chapter
NECA, Portland
R. H. Sroufe, Executive Vice-President
Stubbs Electric Co., Portland
Alden F. Krieg, Managing Director
NELPA, Portland
Jack D. Stevens
Puget Sound Utilities Council, Seattle



1. MID-SPAN TAPS help bring down the over-all cost of distribution with Rome's Triplex SD and secondary cable. You can tap between poles from either side, using conventional hardware plus a spreader block. Simple; fast; saves service wire. You save on pole cost, too—*as much as one-third*. With Rome's Triplex secondary you can span 300 feet from pole to pole. Use fewer poles; save time setting them; eliminate crossarms.

2. SAVE ON HARDWARE. Here's a comparison between the hardware needed to install one open-wire service drop (right)—using one pole—and Rome's aluminum Triplex equivalent (left) using a mid-span tap.

3. CUT MAN-HOURS on installation jobs. Triplex goes up much faster than open-wire service, because it requires less handling, less time installing hardware. It's easier to handle, too—aluminum cable assembly weighs less than conventional copper service wires.

If you take advantage of these important savings . . .

"Expensive" Triplex cables can cost less

Triplex sometimes *does* cost more than its open-wire equivalent.

But its on-line cost can be lower—*if you take advantage of the installation economies* that Triplex alone makes possible.

Fewer poles . . . less hardware . . . faster installation—these are the savings you make with Triplex. They can more than offset any extra cable cost.

In addition, there are many locations where you can improve service and reduce maintenance with Rome's aluminum Triplex. Wooded areas, for example—where Triplex *stays up* despite falling tree branches that might knock out open-wire secondaries. Residential streets, too—where good public relations indicates need for a neat, uncluttered installation.

Fits your modernization pattern

Introduced 10 years ago, Rome's Triplex SD Cable won almost immediate acceptance. As a next step in modernization, many utilities are now using lightweight aluminum Triplex for overhead secondaries as well. If you haven't yet adopted this practice, we invite you to look into the operating advantages—as well as the economies—that this Rome "package" concept offers you.

Specify Rome's aluminum Triplex for your next job. For more information, contact your nearest Rome Cable representative—or write to Department 368 and ask for descriptive Bulletin RCP-361. Rome Cable Corporation, Rome, New York.

ROME CABLE

CORPORATION

EW news roundup

NEW LOOK—The complexion of the Columbia Interstate Compact Commission is undergoing a change, possibly because of prolonged exposure (since 1950) to the Pacific Northwest power development problems.

The commission has voted approval of a study on "the possibility of creating an action agency under compact provisions which would be empowered to acquire, finance, construct, operate and administer multi-purpose projects and related facilities within the Columbia Basin." The original intent of the commission was to draft a recommendatory compact.

James Murphy, spokesman for the Montana delegation, called such a resolution "suicide" for the compact. He pointed out that the negotiating commission had great difficulty to reach agreement on a recommendatory agency.

—EW—

Sylva-Lume, the new fluorescent system of Sylvania Electric Products, has won two awards since its introduction a few months ago. At the fourth National Electrical Industries Show in New York it won "Best of Show"; at the American Institute of Architects Washington, D.C., convention it was cited for "outstanding attractiveness."

—EW—

OUT OF THE FOG—The first major break-through in close to 100 years of scientific research to pierce the fog barrier was recently accomplished at University Park, Pa. Lighting engineers successfully penetrated fog with automotive and highway lighting equipment.

The tests show that it will be possible to increase visibility in fog on the open highway by 100% or more within the next year.

Light control is the key to the method. Mounting angles of highway lighting will be changed, low-mounted white fog lights will be used and light sources will be polarized.

The principle involved is that lighting must be arranged so the driver's line of sight does not travel along the beam either of his own headlights or of fixed highway lights.

—EW—

The aftermath of reading the reports of the Senate approval of a high Hells Canyon Dam is physical and mental exhaustion—even for a person not directly associated with Idaho Power Co. It is easy to imagine the feelings of Tom Roach and his associates who are on the firing line.

—EW—

FOREIGN NOTES—Great Britain's Central Electricity Authority is reported to be working up orders for two 550-mw turbogenerator units. These would be of the double-shaft type because shipping limitations hold the size of generators down to about 275 mw.

Brown Boveri, at the request of Electricite de France, has developed a 220-kv breaker suitable for suspension from steel frames. Of course it is of the air blast type but it ought to give substation designers third dimensional possibilities to conjure with. If substation sites continue to get scarcer and more costly, it might be real handy to be able to hang the circuit interrupter on the terminal tower of the transmission line.

—EW—

Thumping on a theme that is gaining nation-wide acceptance, J. F. Downie Smith, dean of engineering, Iowa State College, suggested that the engineer of the future, like today's surgeon, will be surrounded by technical specialists. Missing from his comments: Where do you get the technicians?

LEGAL MARATHON—After a trial that has lasted more than a full year, Pend Oreille County PUD has won a superior court ruling that it had the right to cancel a construction contract on its Box Canyon Dam.

At about the time you are reading this the PUD and Pacific-General-Shea contractors will be back in court for a determination of the amount of damages the PUD is entitled to. The PUD asked for $5,612,107; the judged whittled off $1,231,725; P-G-S filed a counterclaim for $2,687,644.

Trial transcript is a voluminous 16,918 pages and exhibits numbered 1,300.

Morrison-Knudsen Co. took over the job and finished it after the PUD fired P-G-S for failure to keep up the work schedule.

—EW—

H. K. Porter Co. has acquired R. Thomas & Sons Co. Inc., manufacturer of high-voltage and other electrical porcelain in Lisbon, Ohio. The company will be combined with Porter's Delta-Star Electric Division.

—EW—

TAX HOPE—In Congress now is a bill that would bring about a major reform in the income tax structure. Introduced by Rep. Antoni N. Sadlak of Connecticut, it is designed to give tax relief to the graduated part of income tax rates instead of the basic rate of 20%. The graduated portion ranges from 2% in the $2,000-4,000 taxable income bracket, to 71% at the top. These percentages are all on top of the basic 20%.

The bill is a practical attempt to put the brakes on federal spending. It will compel big federal spending programs to compete against regularly scheduled income tax reductions.

Reductions would be from 20% to 15% in the first bracket rate, made over a period of five years. At the top, rates would be brought

North American F-100 Super Sabre
—backbone of the nation's
supersonic air superiority

North American is a Carol Customer

First operational plane capable of supersonic speed in level or climbing flight, the F-100 Super Sabre is a product of North American Aviation Inc., builder of more airplanes than any other company in the world. We are proud that North American is a Carol Cable customer.

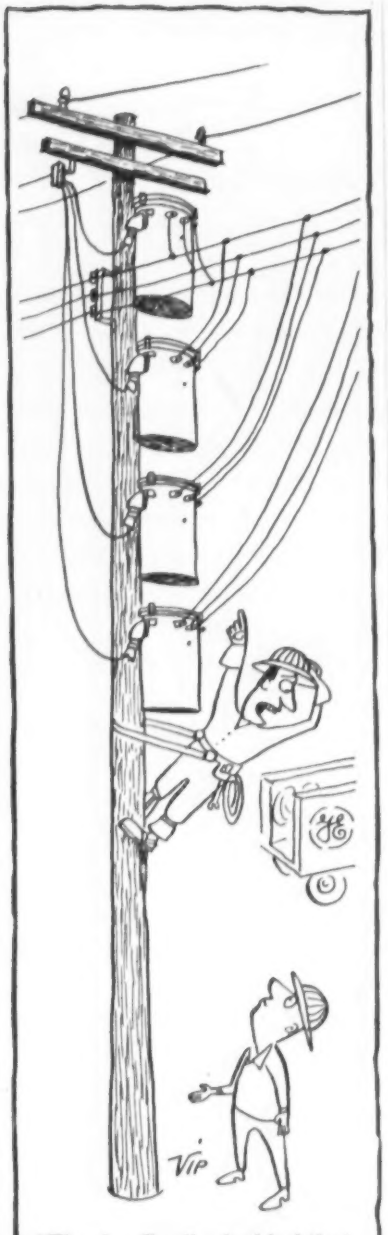
There is a quality Carol Cable for your applications—immediately available in every size. If you want the best in wire and cable at sensible prices, get Carol.

Carol®

NEMA

A subsidiary of Penn-Texas Corporation

CAROL CABLE COMPANY Division of the Crescent Company, Inc.
Pawtucket, Rhode Island
Serving industry for more than 30 years



"They've finally decided that letting G.E. uprate one is a better idea!"

Need distribution transformers uprated fast? Call a General Electric Apparatus Service Shop. The shop can uprate your old transformers in both kva and voltage for about two-thirds the cost of new transformers . . . can also convert to self-protected type. And you get new transformer warranties. Call your G-E Apparatus Service Shop or Sales Office. 431-58

Progress Is Our Most Important Product

GENERAL ELECTRIC

down to 42% from 91% in the same period of time.

The theory behind the bill is easy to understand. Increased production is putting an ever-increasing amount of tax money in the hands of the government. The government in turn is spending the money instead of giving the taxpayers a reduction. By placing a tax reduction system in force, government spending is held in check, citizens are given an almost forgotten opportunity to save, possibly by investing in industry, and a trend to accumulate the $300 billion of new capital we will need by 1975 is started.

Your congressman might like to know your views on the tax bill.

—EW—

A housewife complained of a squeaky electric range. Electric ranges that squeak are rare, to say the least, so Edward Washington, a Sacramento Municipal Utility District serviceman, was probably rather curious when he read his work order. You guessed it—a mouse had made a nest in the glass insulation. The nest was lined with insulation from the wiring.

—EW—

NEW METER—Two General Electric engineers have presented an AIEE paper entitled "An Improved Single-Phase Watt-Hour Meter."

They state in part: "A completely new approach was undertaken which resulted, first of all, in a simple single turn current coil for each of the two current circuits in the meter. This new construction completely eliminates all of the undesirable side effects such as higher losses, torque depression and other effects. . . . A second important improvement has been obtained by magnetically separating the current and potential fluxes and the two electromagnets become more responsive to changes in the values they are each required to measure."

The principles involved in the stator redesign are equally applicable to multiple stator watt-hour meters.

—EW—

Engineers are studying the use of prefabricated enclosures to reduce the sound emanating from large power transformers 10 to 20 decibels. One such enclosure has been built and currently is undergoing tests.

AGRIFACTURE—Industrialized agriculture is the subject of a colorful new cartoon movie entitled "The Bright Promise of the American Farm Market."

Some of the facts presented are startling. Farmers are spending more than $13 billion a year for farm production goods and services from industry. They are using electricity at the rate of 23 billion kwh a year, and this is expected to double by 1965.

The film is for sale by Fortune Films, 9 Rockefeller Plaza, New York 20, N.Y. Producer of the movie was Transfilm.

—EW—

Burndy Corp. has dedicated two plant expansions. One is at Milford, Conn., and the other at Scarborough, a Toronto suburb. Actually the 77,000-sq-ft Canadian plant is brand new. The Milford addition is 63,000 sq ft.

—EW—

JOINERS—Roy H. Glover, chairman of the board of Anaconda Co., as commencement speaker at the Montana School of Mines, told the students that his company employs 1,465 college graduates who come from 330 different schools. Montana School of Mines has supplied 101 of the employees, and is the top source of talent.

Ranking directly below MSM, in order of their representation, are: University of Montana, Montana State College and—watch this one—the University of Chile.

Glover was presented an honorary degree of doctor of laws.

—EW—

Headline on the University of California *Clip Sheet*:

Men's and Women's Brains
May Be Different
We hope so, we hope so.

—EW—

MODERN TOUCH—B.C. Electric's new 22-story Vancouver headquarters has the very latest secretarial service. Through an electronic telephone dictating system, any executive can pick up his phone at any time, dial a code number and dictate to his heart's content.

In a dictating center his voice is automatically recorded on disks which are turned over to a six-girl stenographic pool for transcribing. By using the telephone circuits,

miles of extra wiring have been eliminated. The convenience and time-saving of the arrangement is obvious. All 800 telephones in the building can be connected to the system which automatically turns itself on at 8:30 a.m. and turns off at midnight.

—EW—

Rent for money is going up—fast. First mortgage bonds of the very top-grade utility companies in this country are nudging the 5% region. Money is so scarce that one bank vice-president not-so-jestingly commented that maybe we're going to have to ration it.

—EW—

WESTERNERS elected to AIEE offices at the annual meeting in Montreal are Orien A. Gustafson, San Francisco, a vice-president, and Edwin W. Morris, Los Angeles, a director.

Gustafson is manager of installation and service engineering for General Electric Co. in the Pacific Northwest. Morris is with Westinghouse Electric Corp.

New AIEE president is Walter J. Barrett, who is with New Jersey Bell Telephone Co.

—EW—

ACCIDENTAL FAME — Photographer Ron Jensen, with Seattle City Light, had one of those rare moments that photographers live for. He was on the scene to take pictures of the first structural steel being raised to the roof of the City Light building for its new addition. His picture, instead, turned out to be one of the crane collapsing under the load.

Jensen's by-lined photo appeared in both Seattle dailies and on two local television newscasts.

No one was hurt in the accident.

—EW—

REMINDER — The Western Electronic Show & Convention is at the San Francisco Cow Palace Aug. 20-23. About 30,000 people are expected.

—EW—

NEWCOMER — The word is out that the new Lewis-Clark Generation & Transmission Cooperative is interested in building the Little Goose hydroelectric project on the Snake River near Walla Walla.

The project has been authorized

Your Electro-Tech "Rep"...

brings technical assistance right to your production line

Your Electro-Tech representative is more than a salesman . . . he's a specialist who keeps up-to-date on the latest developments in insulation. You can count on getting his expert assistance the moment it's needed.

Right now, your Electro-Tech "Rep" is working with manufacturers in solving insulation problems . . . frequently contributing ideas that improve quality, save time and speed up production.

Your Electro-Tech distributor stocks a complete line of Electro-Tech coated and impregnated paper, cloth, glass cloth and asbestos cloth insulations in rolls, sheet and tape. All of these insulations are known for their excellent characteristics including high dielectric and mechanical strength, high temperature and moisture resistance, light weight, flexibility, and many others.

What's more, your representative is backed by the Electro-Tech staff, laboratories and facilities—where custom-built insulations can frequently be manufactured at mass-production prices. For the latest information on insulation write for the name and address of your nearest Electro-Tech distributor.

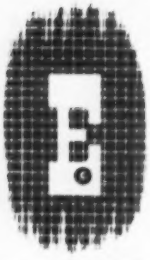
Electro-Technical Products
DIVISION OF
Sun Chemical Corporation
113 East Centre Street, Nutley 10, N. J.

DISTRIBUTED ON THE WEST COAST BY:
TRI-STATE SUPPLY CORPORATION

Los Angeles
544 S. San Pedro St.
MUtual 2354

San Francisco
554 Bryant St.
EXbrook 2-8890
ENterprise 1-0412

Seattle
318 Occidental Ave.
MAin 4161



ESTIMATIC

Estimating with Speed and Accuracy

Estimatic is a simplified system available, on a lease basis, to electrical contractors for fast accurate estimating. It was developed by an electrical contractor and is based on 10 years research and cost accounting on actual electrical jobs.

The basis of Estimatic is the use of assemblies instead of individual items of material in figuring estimates. Each coded assembly has a typical installation standard drawing which shows the items in the assembly and includes a bill of material showing the man hours required for installation.

Estimates are figured by simply "taking off" the assemblies by code and totalling the material cost and man hours.

Basic Manual includes complete instructions on use of system, estimating procedure and installation standards.

Estimating Manual. You do your own pricing from this book.

Advantages. Here's what contractors say about Estimatic:

"My estimator can estimate 3 times as many jobs"

"Reduces chance of error by 75%"

"Estimatic has just about doubled our successful bids"

"Pays for itself in time saved alone"

Write for Brochure

ESTIMATIC Corporation

300 VALLEJO STREET

DENVER 23, COLORADO

by Congress for federal construction so a "de-authorization" would be necessary. No funds have been appropriated.

As reported last month, Lewis-Clark is made up of 12 cooperatives in eastern Washington, eastern Oregon and Idaho.

—EW—

McGraw-Edison Co. has purchased certain assets of the Electrical Products Division of Fairchild Camera & Instrument Corp. at Burlington, Vt. Electric drills, hand saws, bench grinders, sanders and small, precision electric motors are products manufactured.

—EW—

PRICE HIKE – General Electric has announced price increases on products of four departments of the Turbine Division. Large and medium steam turbine-generator units are about 5% higher; mechanical drive turbines produced at Fitchburg, Mass., are costing about 7½% more; gas turbines from Schenectady will cost about 10% more. The fourth increase is on marine propulsion units.

—EW—

TAX HACK – "The share of the nation's output now going into taxes can be cut almost in half by 1975 if the tax structure is revised to encourage individual accomplishment and sustain the creative forces of production," according to Du Pont Co.

In a booklet called "The Story of Taxes," Du Pont tells the theory that even if taxes should stay at more than $100 billion a year, as they are now, the burden will become far less if national output is expanded to $750 billion—82% above 1956—as predicted.

Key to the reduced tax load is to hold the cost of government to its present level—or at least well behind the rate of advance of production.

—EW—

A recent magazine article stated that many employers are spending long hours trying to woo new engineering talent in the front door—and losing them from neglect out the back door. Moral: Take care of what you have or you won't have it.

DISCOVERY—Herb Leggett, editor of *Arizona Progress*, is chuckling over his recent discovery that Texas, which has more counties than any other state, does not have any of the six largest. The six largest counties are San Bernardino, Calif.; Coconino, Ariz.; Nye and Elko, Nev.; and Mohave and Apache, Ariz.

Apropos of nothing in particular, but funny, is a Leggett statement: "The best laid plans are those that are laid on the shelf before doing any damage."

—EW—

French engineers have recently announced the introduction this year of 380-kv voltage in the French transmission system. The change-over from 225 and 150 kv to 380 will be simplified because the French have built convertible lines, utilizing bundled conductors.

The end result will be a double 380-kv loop around Paris.

—EW—

BAILING OUT – Tacoma's long and involved controversy over a municipal hydroelectric project on the Cowlitz River is probably a contributing factor to the loss of three Utility Board members.

Chairman Gerrit Verder Ende, Ralph Johnstone and Tom Anderson are leaving the organization, two by resignation and one by declining reappointment.

In the meantime, the city is preparing to carry its case to the U. S. Supreme Court via the legal firm of Ely, McCarty & Duncan, Washington, D. C.

—EW—

A New England utility man reported recently: ". . . that 15-kv-class distribution properly designed and maintained can be a valuable tool in the effort to keep distribution capacity ahead of load."

Somebody ought to give it a try.

—EW—

NEW LOOK—Recent advances in pole-type regulators call for a review of practices by utility companies, according to Robert Bry, marketing manager of General Electric's voltage regulator product section.

Of the six different types of voltage regulating devices, Bry said, pole-type regulators are the least expensive.

Get 3 Tanks (A Tank Per Phase)

Even on Outdoor Distribution Breakers

ALLIS-CHALMERS
for Progress in
SWITCHGEAR

Don't be 1/3 Safe!

● Be completely safe! Buy breakers that offer positive protection for today's low reactance systems with their corresponding high fault currents. Three tanks, not just one, provide maximum protection.

Enjoy this big breaker type protection in outdoor distribution breakers at no extra charge. Other big breaker features include: AEIC-NEMA standardized control wiring; two vertical breaks per phase, using time-tested *Ruptor* devices; self-aligning, self-wiping tulip and bayonet contacts.

Ask for Bulletin 71B7946 for the complete story. Contact your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Ratings: 14.4 kv, 100 and 250 mva

Ruptor is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5146

GEDNEY'S RIGHT THERE IN YOUR CORNER

helping save time . . . hold down costs

CORNER FITTINGS? Well, here are three that have proved immensely popular for the simple reason they're easiest to install—save time and labor that really counts up. Like the rest of the full Gedney line they're made of unbreakable malleable iron...accurately machined and threaded . . . individually inspected. Order Gedney—always—for lowest installed costs!

90° CORNER ELLS

Fitted with gasketed cover. Both ends female. Made of malleable iron, cadmium plated. Available in a full range of sizes from ½" to 2".

90° CORNER ADAPTERS

Fitted with gasketed cover. One end male, one end female. Made of malleable iron, cadmium plated. Your choice of sizes from ½" to 2".

CORNER PULL-IN CONDUIT ELLS

Today's top specification for space-saving, machine wiring, easy wire pulling. Malleable iron, cadmium plated. Sizes run from ½" to 2".

GEDNEY FITTINGS FIT

GEDNEY
ELECTRIC COMPANY

GEDNEY

RKO BLDG. • RADIO CITY • NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.

regional roundup

Pacific Southwest

► Jim Nemeth recently was appointed sales representative for the magnet wire items at Anaconda Wire & Cable Co., Los Angeles. His territory includes southern California, Arizona and southern Nevada.

► A. W. Tracy of Anaconda attended the two-day Independent Telephone Assn. meeting at the Ambassador Hotel, Los Angeles.

► Two new sales representatives at Earl Condon Co., Los Angeles, are Alvin Mathies and Leroy Cox. Mathies is working with representatives of the aircraft industry and Cox is calling on members of the utility and electronics industries. Both men are working the southern California area, and were formerly with Condon's customer relations department.

► Bob McPherson, director of public relations at Daystrom Pacific Corp., Los Angeles, will have charge of the company's gyro and potentiometer division displays at the Western Electronics Show & Convention in San Francisco Aug. 20-23.

Also from Daystrom comes word of the addition to the staff of Jack Zillman as director of sales. Zillman was formerly with U.S. Industry, a Florida organization.

► There's been a great deal of activity recently at Gough Industries Inc., Los Angeles. Phillip Gough Jr. joined the firm following the return from a June wedding at which his father served as best man. Vice-president and Mrs. T. S. Bell spent several weeks soaking up Hawaiian atmosphere in Honolulu, and returned to Los Angeles the first week in July.

And some rather surprising statistics came out of this firm last month—although specializing as distributors in electrical equipment and appliances, it seems that the greatest sales volume during the past month came not from the sale of such equipment but from sales of (believe it or not) foreign automobiles, namely the Austin Healy and MG.

And a final note—Ernie Karsten of Gough attended the NAED area meeting at the Town & Country Hotel in San Diego the last week in June.

► John Maddox of John Maddox Sales Co., Los Angeles, attended a Hill Transformer sales meeting in San Francisco in June. Lew George has joined the John Maddox sales force as a representative calling on machine tool jobbers in the greater Los Angeles area, south to San Diego.

► There has been a real Scottish brogue heard among the voices at Ray J. Noel Co. Inc., Los Angeles, since June 1, when B. E. "Scotty" Gunn joined the firm as office coordinator of the company's southern division.

► On schedule at Packard-Bell Electronics Corp. are plans to supply technical information and assistance to the Tokyo Communication Equipment Co. Ltd. of Kawasaki, Japan, in the manufacture of airborne identification equipment currently being produced by P-B for the Air Force. News of the plan came recently from Richard B. Leng, vice-president in charge of the company's technical products division. The government-authorized contract, part of a technological assistance program set up to increase defense capabilities of friendly nations and insure interchangeability of common weapon systems, was signed recently by Sunao Koga, managing director of the Tokyo firm.

► Charles Clark, sales manager for Packard-Bell's new electronic garage door opener, was in charge of display booths for this new item at the "Do-It-Yourself-Show" in Pan Pacific Auditorium, Los Angeles, July 18-28.

► Roger Miller recently joined the Los Angeles office of Sangamo Electric Co. as a sales representative for the firm's electronic components. Miller, who came to Los Angeles from the Springfield office, will represent Sangamo in the southern California area south of Bakersfield, and throughout the state of Arizona.

► For those who really like to plan ahead, the EMEA of Southern California has set March 27-29 as the dates for its ninth biennial electrical industry show planned for staging in Los Angeles' Shrine Exposition Hall. Robert J. Kernaghan, Goodyear Tire & Rubber Co., is serving as director of the show committee. Among committee members from the Los Angeles area are V. P. Gunness, General Electric Co.; R. J. "Jack" Rohring, Southern California Edison Co.; King D. Christopher of Clark Controller Co.; and L. J. Rejda, Larsen-Hogue Electric Co.

Members of the executive committee and advisory board include President Charles H. Hays, Electrical Estimators; First Vice-president Harry D. Huff, American Pipe & Construction Co.; and the following board members: Paul H. Henrichs, Southern California Edison Co.; Charles M. Tabor of Larsen-Hogue Electric Co.; and Frank R. Tharp of Floodlight & Fluorescent Maintenance Co.

This year's program will combine the fifth electrical maintenance conference with the industry show. In the previous years these two events have taken place on alternate years.

Intermountain

► One of the niftiest lighting fixture showrooms in the Rockies has been opened by Rite Lite Supply Co. at its new location in Denver, 2826 N. Speer Blvd.

Leigh Condon, president, is particularly proud of the individual operation of 250 fixtures mounted on separate 2x2-ft pegboard panels in the ceiling.

Minneapolis-Honeywell Tap Lite switches are installed in each of the panels. Customers are provided with

a 2-ft-long wood stick. With it they can tap the switch and turn on the fixture in which they are interested.

In addition to the 250 fixtures controlled individually, there are more than 250 other fixtures in the showroom arranged on wall boards.

Rite Lite, a wholesaler to the electric trade only, was founded a short 10 years ago. It is distributor for more than 40 manufacturers. Condon says his aim is "to bring to our customers the finest and largest selection of lighting fixtures in the entire West."

► A top-level change and a major expansion keynote Westinghouse Electric Corp. activities in the region this summer.

Arnold F. Buck has been appointed Rocky Mountain district manager to succeed L. A. Goalby, who is going to retire this winter. Until retirement Goalby will serve as consultant to L. W. McLeod, vice-president and southwestern regional manager at St. Louis. Goalby will remain in Denver.

Buck, with Westinghouse since 1922, has been most recently manager of the industrial, marine and aviation departments at St. Louis. He is a native of Denver.

Buck will be in charge of electrical apparatus sales to industrial and utility customers in Colorado and parts of Wyoming, South Dakota, New Mexico, Texas and Arizona.

► Three regional officials of Sylvania's Lighting Division attended the division's first national sales meeting recently at French Lick, Ind. The trio was headed by Carl Long of Denver, district manager. With him were Richard M. Wintin of Denver and Robert W. Erskine of Salt Lake City.

Sylvania is increasing its activities in the Rocky Mountain area with the addition of Duane Little as fluorescent fixture specialist. He was transferred from Fargo, N.D., where he represented all Sylvania products.

► L. S. Reed of Denver reports his company has been appointed agent for Raco switch and outlet boxes manufactured by All Steel Equipment Co. of Aurora, Ill.

► Robert Person, vice-president of Public Service Co. of Colorado, who has a long record of civic service, has tackled another big job for Denver. He will head the public division of the Mile High United Fund. The newly formed United Fund combines all charity drives in the Denver metropolitan area.

► A. C. Genor, formerly in the Denver city government lighting department, has joined Line Material as Mountain States division lighting engineer. After the next few months in Denver, Genor will be based at Spokane, Wash.

► REA officials will have a big part in the American Institute of Cooperation summer conference at Colorado State University in Fort Collins Aug. 18-21. REA Administrator David Hamil will be a principal speaker and the afternoon session of Aug. 21 will be chairmanned by Walter Lassen of Huron, S. D., president of the REA State Managers Assn. The theme of the meeting is "Cooperatives in Our Big Business Economy."

► A Craig, Colo., businessman, Ora K. Harris, was elected president of the Yampa Valley Electric Assn., a REA with headquarters at Steamboat Springs, Colo.

► General Electric employees swept top honors in the annual golf tournament sponsored by Rocky Mountain Electrical League at the Columbine Country Club course in Denver. R. L. Fallander of the Apparatus Division won the Ross Adams Memorial Trophy with a low net of 80. His handicap was 15. The low gross score of 75 was turned in by Jim Roger, head of G-E's lamp department in Denver.

► E. S. Reed, who has been in the electrical industry in Kansas City for the past 10 years, has taken a position as sales engineer with Fred E. Staible & Sons, representative in the Rockies for several electric manufacturers.

Pacific Northwest

► With the breaking of summer and the opening up of vacation season, Portland GE Co. is emphasizing its recreation facilities and its conservation program (see article in this issue). Jim Goggin, manager, community relations, reports that nine parks for use by the public are available or are under construction. Three of these, at Timothy Lake on the Clackamas, and at North Fork and Pelton dam sites, are equipped for overnight camping. A converted administration building at Timothy furnishes sleeping quarters for PGE employees and their families.

Timothy Lake was opened for the first time at the opening of fishing season the latter part of May, and

3,000 gave it a try with varying luck, mostly pretty good.

The Pelton camp on the Deschutes is not yet ready for the public, but people are visiting the project in large numbers and being shown around by the company's two hostesses. Ten thousand people have visited the site since construction began, 2,000 of them in June.

► Last major contract for Pelton, covering installation of electrical equipment including main generators, transformers and switchgear, was recently let to Anderson-Burke Corp., Seattle. It is expected that generator tests will be made toward the end of this calendar year and that the plant will go into a regular production schedule early in 1958. First foreman for the plant, Victor W. Bacon, with the company 23 years, and lately from the load dispatcher's office in Portland, took over his new job July 1.

► A 10-mile trip by tank truck helped several hundred migrating steelhead on their journey to the sea recently. PGE drew down its Faraday reservoir on the Clackamas in connection with its expansion project there and on the North Fork and found the big fish in the shallows. George Eicher, PGE's biologist, and Zeke Madden in charge of fish operations at Pelton, along with Faraday Foreman Russell Reed, superintended transporting the fish to a point below the Faraday Dam in a 1,000-gal tank and truck equipped with aerating machinery.

► The Brownlee project of Idaho Power Co. is more than one-half completed and will bring in its 360,400 kw by the end of 1958. This capacity, which will have been brought about in three years, will nearly double the company's present 375,000 kw, the achievement of the company's first 40 years of life. These facts were brought out by T. E. Roach, president, in talks before five employee meetings in June.

An unusual feature of the eastern division meeting at Pocatello was the presentation of a plaque to President Roach paying tribute to his leadership of the company through several difficult years, and expressing appreciation of the employees for the kind of management the company has been enjoying. John Ramey, foreman at Blackfoot, made the presentation on behalf of the division employees.

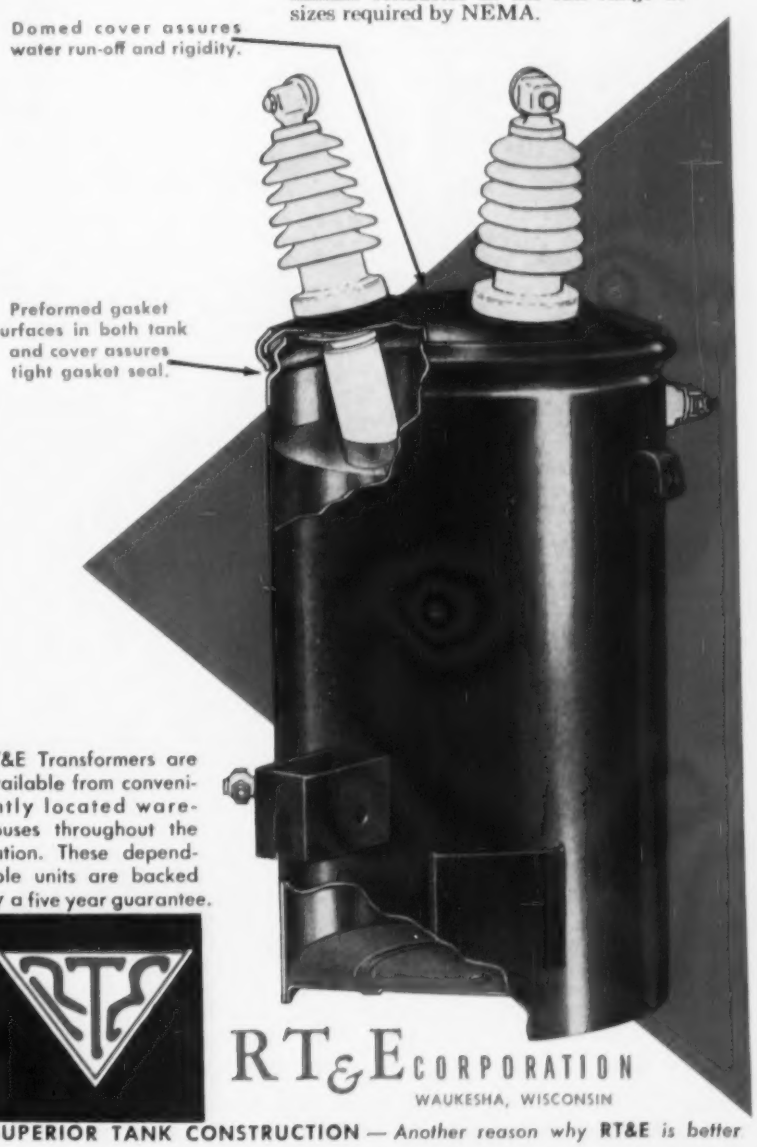
► An award by the Montana Chapter of NECA to the Montana Power Co. for the "furthering of the free-

What Makes RT&E Transformers Better?

SUPERIOR TANK CONSTRUCTION
for longer Trouble-free life

RT&E tanks get three coats of modified alkyd paint — two coats flowed on, final coat sprayed — and each coat individually baked. This thoroughness provides the highest type of weather resistance. Arc welding of all seams, brackets and mounting pads, eliminates moisture traps and corrosion.

These heavy gauge steel tanks, with circular grooved bottoms, assure extra strength. Tin plated, locked type terminals accommodate either copper or aluminum conductor in the full range at sizes required by NEMA.


Domed cover assures water run-off and rigidity.
Preformed gasket surfaces in both tank and cover assures tight gasket seal.

RT&E Transformers are available from conveniently located warehouses throughout the nation. These dependable units are backed by a five year guarantee.

RT&E CORPORATION
WAUKESHA, WISCONSIN

SUPERIOR TANK CONSTRUCTION — *Another reason why* **RT&E** *is better*

dom of enterprise in our industry" was given at the chapter's recent convention in Butte by Robert P. Burns, chapter manager. Vice-president C. J. Burns of the power company accepted the plaque. The contractors presented individual certificates to the following company men for their part in the company's program: D. J. McGonigle, sales manager, and division managers, George Scotten, Billings; H. K. Near, Bozeman; F. J. Lynch, Butte; H. K. Dickenson, Great Falls; Dix C. Shevalier, Helena; W. W. Talbott, Lewistown; and Harry McCann, Missoula.

Other folks won other honors. Don Brooks, supervisor of central billing for PGE, was elected to the board of directors of the Portland Chapter, National Association of Cost Accountants. Berkeley Snow, retired, was given a handsome plaque attesting to his long service with NELPA and the industry in the Northwest. Al Krieg, executive manager of NELPA, made the presentation at a meeting of the Electric Club of Oregon in June.

Prime award of the month went to four line workers of Utah Power & Light Co. They received the Claude L. Matthews award for valor at the June convention of the EEI in Chicago, cited for "acts of devotion to duty calling for extraordinary courage in efforts to maintain important electric service in 20-below weather in the winter of 1956." They were gang foreman Dayton L. Kelly, journeyman lineman John Griffone, line working foreman O. Maron Oveson, and lineman George Bryner.

► McRoy Hoverter, sales engineer in the Apparatus Sales Division of General Electric Co., Portland, has been transferred to G-E Supply Co., Seattle, as power apparatus specialist. He is replaced in Portland by Donald A. Edwards, from G-E's Ft. Wayne, Ind., plant.

► Dunham-Bush Inc., manufacturer of air conditioning, heating and refrigeration products, Portland, has appointed R. G. Potter sales engineer in Oregon and Washington.

► Installation of Pacific Power & Light Co.'s million-dollar electronic data processing system is nearly complete and testing out of the central figure of this system, the Datatron, is going forward, according to Don C. Frisbee, assistant treasurer. Some billing will be done on an experimental basis in the next couple of months, and this fall the system will be put into operation district by district until all the company's 300,000 bills are covered. The company has brought in to Portland men from all over the territory to operate the system. Key men on the team are Vern Thomas, programming, Ervin E. "Smitty" Smith, conversion from old to new method, and Hank Kaplan, IBM and computer operations.

► Old-timers retiring from active service recently are Al Woodhead of Idaho Power Co., who began his electric industry career in 1913. He has been in just about every branch of electric service work, ending as district manager at Jerome. E. C. Waugh, steam superintendent for Pacific Power & Light Co. at Yakima, retired after 38 years service. His experience in Enterprise, Ore., in the early days takes in the time when the town had daytime electric service only three days a week, so housewives could make use of that new-fangled device known as an electric flatiron.

► An era ended in Portland last month. PGE burned the last of its hogged fuel in Station L, the boilers having been converted to oil or natural gas burning. For many years a huge pile of sawdust and hogged fuel, mountain high in the spring during high water in the rivers, graced the yard of station L next to the lumber mill. Gradually the pile would disappear with use through the fall and winter. The pile was known as "Mt. Osborne" after C. P. Osborne, veteran superintendent of the company, now retired.

Northern California

► It was interesting to listen to Bob Schulz, electronics systems engineering manager at Sylvania's Mountain View laboratories, as he told of his trip to Russia. At the time, the most recent "purge" had not taken place, but the non-political tone of his report was refreshing, and probably would not be any different in view of subsequent events.

Two things were outstanding to Schulz as he visited various industrial plants and talked to many people. He was impressed by both the quantity and quality of engineers and scientists that are being turned out by the Russian education factories. He thinks they can equal or even surpass our own efforts in the research and development phases of electronics. Counterbalancing this, in part, according to his observations, are the poor methods and equipment in the production stages.

He confirmed other reports we have heard that Russian industry is taking on the look of free enterprise. The money still comes from the government, but industry control is passing to lower levels than the political bureaus.

► Charlie Long has formed his own manufacturers' agency under the banner of Long & Associates. Address is 1210 Canterbury Drive, Burlingame, Calif., and telephone number is DIamond 3-8537. His attractive, formal announcement states: "Inquiries on electronic-electrical equipments and components are most welcome."

► Pacific Electric Motor Co. has opened new warehouse and office facilities at 610 W. 10th St., Pittsburg, Calif. Peter C. Jacobson is manager there. Headquarters are still in Oakland.

► Tom Garvey, former products manager at Fresno for Incandescent Supply Co., is now manager of the Sacramento branch. His assistant is Vern Swanson, who was formerly factory credit manager. Herb Williamson is in charge of government accounts.

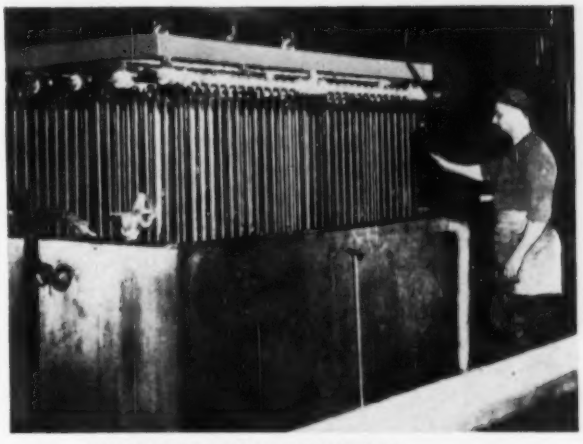
► Leighton Stone Corp., 770 Folsom St., San Francisco, is a new distributor of Asco solenoid valves, a recent announcement reveals. Paul S. Everly Co. is the manufacturers representative for Automatic Switch Co.

► Speaking of Paul E. Everly calls to mind that he has developed an interesting product of his own. *Product News* this month carries a picture and brief description. In case you don't see it, though, it is a grounding device to improve safety while stringing conductors.

► Attending a recent general sales conference of Holophane Co. at Bear Mountain, N.Y., were R. G. Dummel, district manager for northern California, and J. J. McCullough, company sales engineer in this area.

► General Electric Co. has been keeping the local folks (and others) entertained with closed circuit telecasts to introduce their new appliances. Don't know what happened in the other 42 cities when the picture of a steam-dry-SPRAY iron appeared on the screen, but in San Francisco it drew a pleasant, surprised chuckle. Sticking the calloused neck out on a forecast, one would say the sound of the chuckle will quickly be converted to the ring of cash register bells.

these 4 SPANGLEAM features help you make better EMT installations!

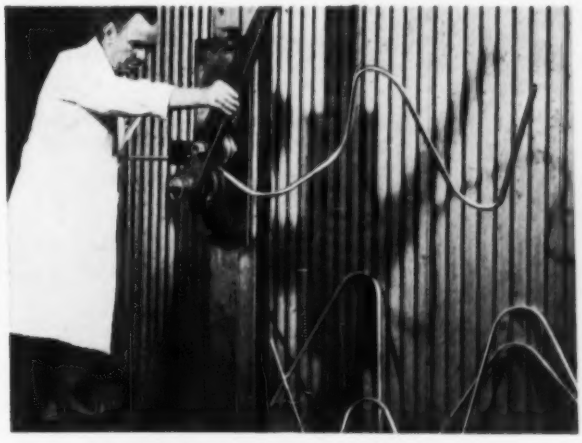


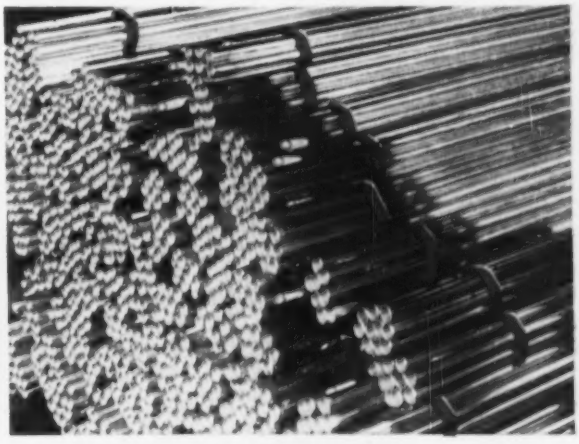
1 SPANGLEAM FINISH

First step is the application of a uniform electro-galvanized finish; then the tubing is dipped in the special-formula SPANGLEAM solution. Result: a bright, durable finish that has high corrosion resistance, makes an excellent appearance in exposed locations.

2 QUALITY TESTING

To be sure the SPANGLEAM finish more than meets UL requirements and Federal Government Specifications WW-T-806b, a random sample from each lot of SPANGLEAM is subjected to the copper-sulphate Preece Test. Any EMT that does not measure up is discarded. You get only the best!





3 MECHANICAL TEST

Sample lengths from each lot of SPANGLEAM produced are bent in all directions well beyond normal requirements to test weld and finish. Any rupture of weld or flaking of finish causes that lot to be discarded. Inspection is also conducted for uniformity of diameter, straightness and finishing.

4 SAFETY PACKAGE

SPANGLEAM EMT is bundled automatically for shipping in blue plastic tape. This tape assures a tight package, prevents individual lengths from slipping, provides easy handling, better storage and quick identification and inventory. Saves you time, prevents accidents!

Convince yourself that you can make fast, money-saving installations with SPANGLEAM EMT. Order SPANGLEAM for your next job from your local Spang Distributor.

SPANG® CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
TWO GATEWAY CENTER, PITTSBURGH, PA.
District Offices and Sales Representatives in Principal Cities

wonder where the BUBBLES went?

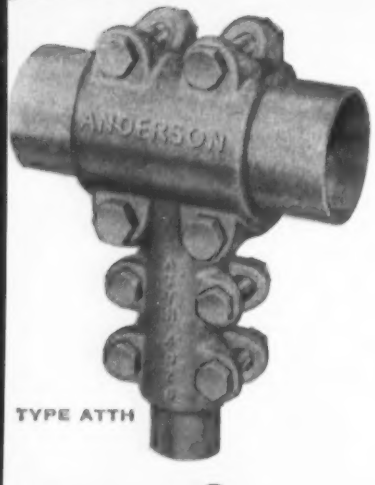
Visible voids spot the test pour of an improperly-fluxed heat of aluminum.

A typical cross-section of sound, bubble-free Anderson Aluminum test pour.

QUALITY CONTROL from the very start removes any chance of "gas porosity" weakness from

ANDERSON *Aluminum*

SUBSTATION CONNECTORS



TYPE ATTH

ANDERSON PREDETERMINES LONGER LIFE . . . greater efficiency . . . and higher tensile strength by putting to work the *probing, fact-producing* experiences of 30 years of Aluminum Connector manufacture.

Insuring "high density" by completely eliminating *pin-hole gas porosity* in aluminum castings is just one of Anderson's check-point measures in the production of connectors of outstanding quality. Every heat of aluminum is checked to guarantee that no connector will fail in service because of *voids* in the casting created by *tiny gas bubbles!*

Any Anderson Representative can give you the full, detailed story of our exacting QUALITY CONTROL measures . . . consult your nearest Representative or write to the home office.

Aluminum & Bronze POWER CONNECTORS • CLAMPS • FITTINGS • ACCESSORIES
for SUBSTATION • TRANSMISSION • DISTRIBUTION

ANDERSON ELECTRIC

CORPORATION

BIRMINGHAM 1, ALABAMA

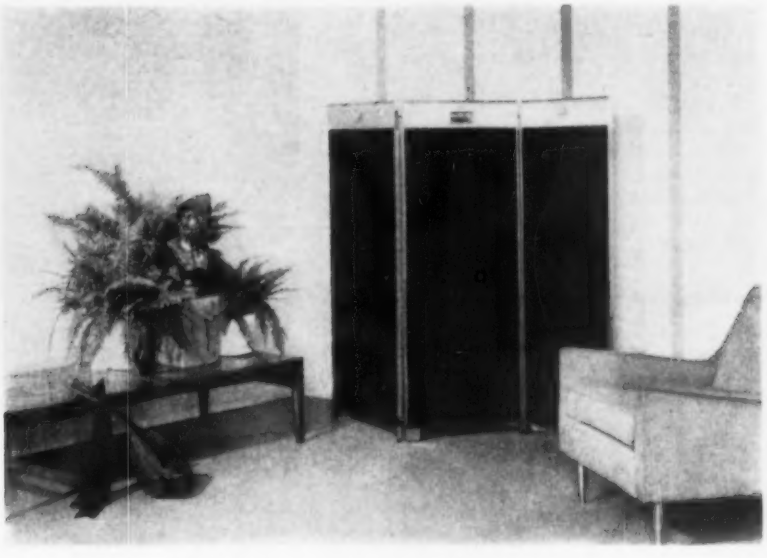
TYPE AUR

TYPE ACF

TYPE ATTC

PRODUCT NEWS

New Designs and Applications



Radiant Heat Screen

(1) *Avan Industries Inc., Columbus, Ind.*

This new heater has the form of a three-panel screen of black, quilted vinyl. It is 55 in. high and 64 in. wide, giving it a radiant heating area of 20 sq ft. The screen never becomes hot to the touch, the manufacturer reports. Heat can be focused directly on an individual by turning in the wing panels.

Automatic Room Heaters

(2) *Toastmaster Division, McGraw-Edison Co., Elgin, Ill.*

Two new automatic room heaters with fast-action elements are announced by this company. The new heating element consists of a coil of ribbon resistance wire wound on a spring-tensioned reel. With no porcelain or metal tubes to heat up, the manufacturer says heating action is immediate and effective. Reflectors are slotted to permit free flow of air circulated by the positive pressure blower fan. The thermostat is located in the air stream at the bottom of the heaters.

Radiant Baseboard Units

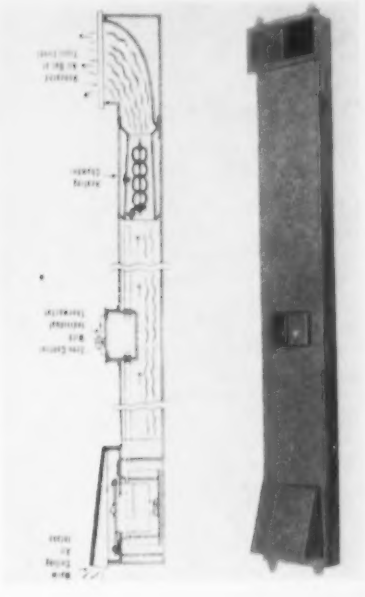
(3) *Ampere Industries, 60 Boston St., Newark 3, N. J.*

A radiant efficiency of more than 91% is claimed for the Amp-Quartz element in these baseboard electric heating units. Units feature dual voltage and may be operated on either 120- or 240-v circuits. Manufactured in 600-, 1,000- and 1,500-w ratings, the units are attractive and compact. They are 2 in. wide and 8 in. high, and may be painted to fit the decor of the room.

Baseboard Heaters

(4) *Ceilheat Inc., 5212 Homberg Dr., Knoxville, Tenn.*

A baffle arrangement that projects heated air currents into the room is a feature of each of 10 new models of baseboard electric heaters offered by this company. The baffle arrangement is said to help give a cleaner operation and to reduce wall streaking. Models are available in 120-, 208- and 240-v sizes, with capacities from 500 to 2,000 w. A descriptive folder is available.

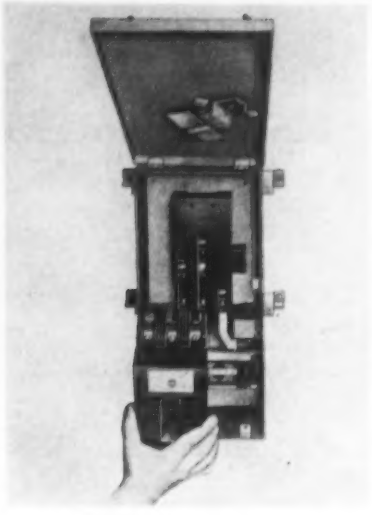


New Control

(5) *Electrend Products Corp., State and Water Sts., St. Joseph, Mich.*

New on this company's forced air electric heating system is a hydraulic action thermostat that is said to be capable of maintaining a minimum of ½° temperature differential. In conjunction with the thermostat, a bonnet control had been added to operate the fan independently of thermostat action. The fan is permitted to distribute all the heat in the chamber before turning itself off.

For manufacturers' bulletins with additional information on these products, fill in coupon on page 31.



Plug-in Disconnect

(6) *Federal Pacific Electric Co., 50 Paris St., Newark 5, N. J.*

A single bus duct plug-in disconnecting unit that can be used for all ratings from 15 amp, 250 v, to 100 amp, 600 v, has been announced by this manufacturer. The device accepts the same E and F frame molded case breakers now used interchangeably in the company's line of AB-Is and distribution panelboards. Enclosures are supplied with an interlocking cover that prevents opening when the breaker is in "on" position. A positive handle mechanism, that may be padlocked, plainly indicates on, off or tripped breaker position.

Nylon Safety Strap

(7) *Miller Equipment Co. Inc., Franklin, Pa.*

Spun nylon webbing is used by this company for a new line of safety straps. The solid woven material is said to have excellent dielectric qualities and is designed with a red center that shows wear to indicate replacement time. It is available in all stock sizes and is identified with a suffix "N" added to the strap length required.

Time Switches

(8) *International Register Co., 2620 W. Washington Blvd., Chicago 6, Ill.*

This company is introducing new tungsten rated time switches to handle heavy-duty incandescent lighting loads. The switches are said to carry a momentary inrush surge of more than eight times their normal amperage rating. Models in the line include standard on-off, switch, skipper and short interval switches.

Contact Rings

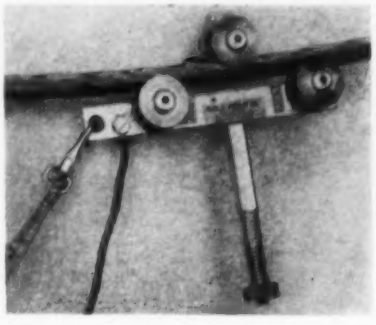
(9) *Gibson Electric Co., Franks-town Ave., Pittsburgh 21, Pa.*

New silver-nickel-graphite electrical contact rings developed by this company are said to have improved performance of current carrying hinged connections on such electrical products as circuit breakers and disconnecting switches. Made of powdered metals, the new ring material is said to bring better contact when used as "washers." Contact rings may be furnished with silver solder backing.

Outdoor Switchgear

(10) *Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.*

Features of indoor metal-clad switchgear in a weatherproof outdoor enclosure are provided in this new product. Design provides a sheltered aisle for all-weather operation and maintenance. The new design eliminates front and rear doors and encloses the common operating and maintenance aisle, therefore reducing plot area as much as 40%. It is said to be particularly suitable to a double row, double bus arrangement.

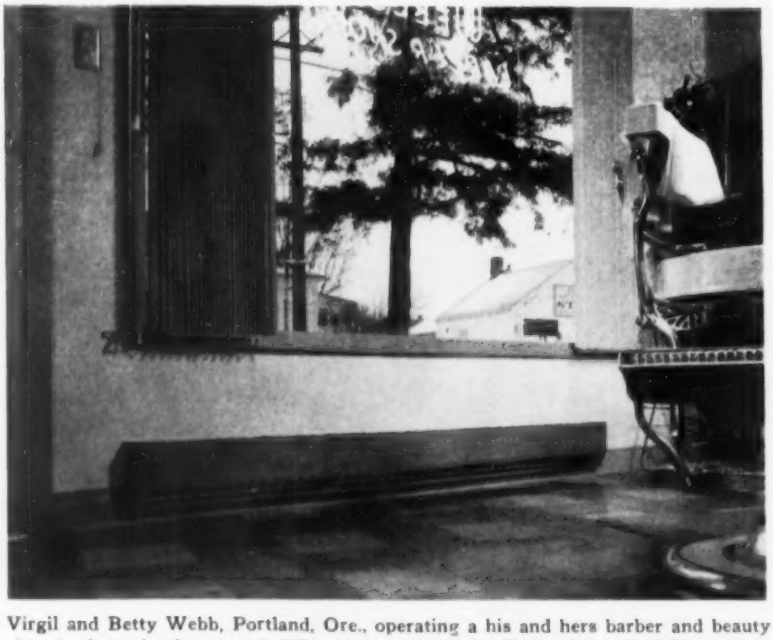


Grounding Device

(11) *Paul S. Everley Co., 550 Ninth St., San Francisco 3, Calif.*

Called Ever-Ground, this device is designed to provide constant grounding of conductors as they are pulled on a stringing job, giving protection to lineman against accidental energizing of the conductor. With the device secured at the reel or crossarm, the conductor is pulled through it on high contact rollers secured to the conductor by a coil spring. Models are available for all sizes of conductor. Snaps on the line at any desired point without a threading-through operation.

Electric Heat for "His and Hers"



Virgil and Betty Webb, Portland, Ore., operating a his and hers barber and beauty shop business in the same building, have solved the "his and hers" differences in temperature preference with Westinghouse baseboard electric heating units. The barber shop has six 500-w units and beauty shop seven. Units are turned off nightly

PREFORMED ARMOR-GRIP SUSPENSION UNITS provide a

Pretty Soft Life for a Conductor

. . . cradled in durable neoprene

No vibration fatigue here. The Preformed Armor-Grip Suspension Unit (AGSU) eliminates failure by eliminating stress concentration.

The conductor is cushioned in a split neoprene core, held securely by Preformed rods that never lose their tight grip, and supported in an aluminum housing. Conductor is protected and longitudinal stresses are distributed through the entire length of the rods—not at one point.

Like other Preformed line accessories, the AGSU obsoletes bolted hardware. It's easier to apply (no tools needed), costs less, does a better job. You get mechanical strength and electrical protection, and—because of the smooth contour and large diameter of the rod ends—corona emission and radio influence are minimized.

Want to know more about the Preformed Armor-Grip Suspension Unit —or see the application demonstrated? Write PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable Address: Preformed-Cleveland . . . in 10 years the leading manufacturer of armor rods, dead ends, Guy-Grip dead-ends and other line accessories.

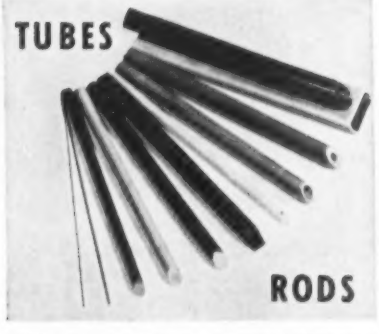
PLP

You can look up to Preformed

Made in accordance with or for use under one or more of the following U. S. Patents: 2,722,393; 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.

TRI-STATE
Headquarters for

Industrial
FORMICA®
Laminated Plastic
Product of CYANAMID



Now you can get prompt delivery of Formica sheets, tubes and rods from Tri-State, west coast headquarters for Formica laminated plastics—the toughest, strongest, most durable material in its weight class. It's half the weight of aluminum. Its strength-weight ratio compares favorably with steel. Meets or exceeds the standards set by N.E.M.A. Versatile and productive, there's a grade for every requirement.

***FREE* Grade Selector**

Selects the right grade for your application. Phone or write us for your free Selector.

For the nation's finest electrical, electronic, and industrial supplies, make
ONE CALL FOR ALL TOP BRANDS
TRI-STATE
SUPPLY CORPORATIONS
LOS ANGELES 13 • 544 South San Pedro St. MUtual 2354
SAN FRANCISCO 7 • 544 Bryant Street EXbrook 2-8890
SEATTLE 4 • 318 Occidental Avenue MAin 4161

Extendible Derrick

(12) *J. H. Holan Corp., 4100 W. 150th St., Cleveland 11, Ohio.*

Ability to lift heavy loads in low ranges, body loading up to 4,000 lb and an operating range that permits the use of power feed attachments to force diggers into the ground are stated features of this new extendible boom derrick. With boom head extended, the unit handles poles up to 75 ft long, the manufacturer reports. Completely hydraulic, the unit has two auxiliary lift cylinders that can move the derrick to within 10° of vertical, two main lift cylinders to give greater leverage and a fifth cylinder for extension of the boom. All are controlled by three levers that can be located where desired on the truck.

Dry-type Transformer

(13) *Standard Transformer Co., Warren, Ohio*

Incoming line, transformer and outgoing feeder are compactly arranged in a new dry-type transformer for inplant distribution of power offered by this company. The unit is 63½ in. high, 74 in. long and 38 in. deep, and is shipped, handled and installed in one piece. Operation and routine servicing can be done from the front of the unit. No vault is required. Various combinations of high- and low-voltage switchgear at all kva and voltage ratings are available.

Motor Protecting Relay

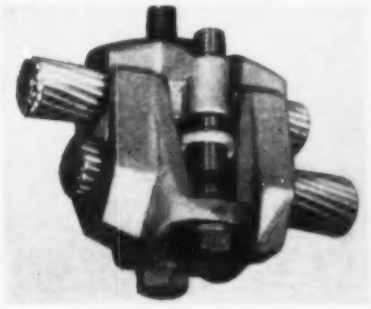
(14) *Electrical Service Co., Ardis Heights, Greenville, Tex.*

A relay to protect a three-phase induction motor, of any capacity or voltage, from shaft overload, voltage unbalance, single phasing or under voltage is offered by this company. The new relay was introduced recently at the Houston, Tex., convention of the Petroleum Section of AIEE.

Outdoor Switchboard

(15) *General Electric Co., Medium Voltage Switchgear Department, Schenectady 5, N. Y.*

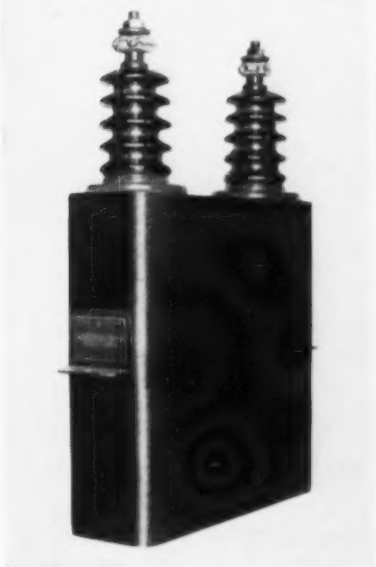
Metal-enclosed outdoor switchboard equipment, similar in appearance to metal-clad outdoor switchgear, is said to eliminate the need to allot control building space for switchboards. A secondary economy is found in locating the switchboards near the apparatus they help protect, reducing the amount of wiring needed. Space is provided at front of enclosure for protection of servicing personnel while carrying on maintenance during inclement weather. Sides are eliminated in a line of several units, and the space becomes a walk-through aisle.



Two-bolt Clamps

(16) *Penn-Union Electric Corp., 315 State St., Erie, Pa.*

A new design for aluminum two-bolt clamps by this company includes a spacer with wrap-around finger, enclosing the conductors over the fitting's entire range, from maximum to minimum. It is reported that the greater contact surface gives increased conductivity and grip and minimizes cold flow of the cables. Bolts are captured so they cannot drop off during installation.



Capacitor

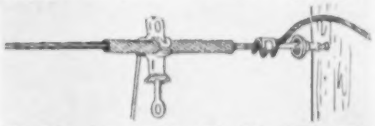
(17) *General Electric Co., Hudson Falls, N. Y.*

This company is now using a fabricated, corrosion-resistant steel case for its 25-kvar capacitor that does not require protective repainting, according to the manufacturer. The units are 4 in. wide and over-all height is 20½ to 21¾ in. Weight ranges from 49 to 52 lb, depending on voltage rating.

6 WAYS TO PROTECT OVERHEAD TRANSMISSION AND DISTRIBUTION LINES WITH FANNGRIPS

ARMOR RODS
To protect and strengthen lines at points of maximum stress or where wear or breakage is likely to occur.

LINEGUARDS
Economical conductor protection where short conductor spans and low tensions are used.



TAP ARMOR
Provides maximum line protection on long spans at the points of clamp attachment.

PATCH RODS
For open-span repairs, where conductor damage is minor and is confined to the wires of the outer layer.

PLASTIC FANNGUARDS
Protect wire coverings and prevent tree abrasion to overhead lines.

FANNER Superformed PRODUCTS

Licensed for use under Patent No. 2,275,019

WRITE FOR LITERATURE

THE FANNER MANUFACTURING COMPANY
Electrical Products Division

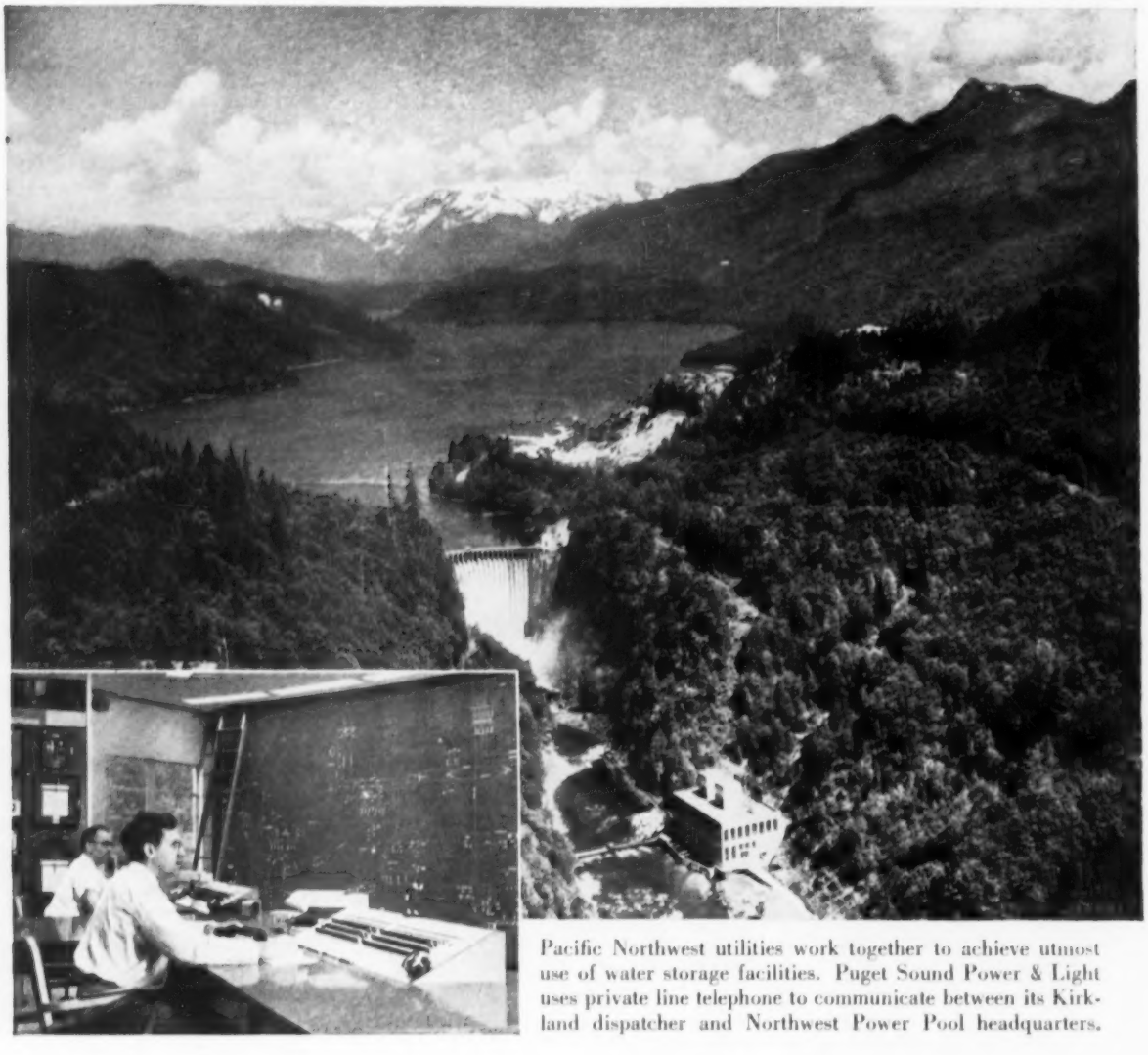
Fine Fanner Superformed

BROOKSIDE PARK • Established 1894 • CLEVELAND 9, OHIO
Telephone: SHadyside 1-6000

AGENTS and DISTRIBUTORS IN PRINCIPAL CITIES

NOW . . . through its Plastic Division, FANNER offers a wide variety of INSULATING TUBINGS and MOULDINGS for electrical purposes.

HOW BELL SYSTEM COMMUNICATIONS WORK FOR THE POWER INDUSTRY



Pacific Northwest utilities work together to achieve utmost use of water storage facilities. Puget Sound Power & Light uses private line telephone to communicate between its Kirkland dispatcher and Northwest Power Pool headquarters.

Puget's dispatcher arranges power transfers by fast, reliable private line telephone

When Puget Sound Power & Light's dispatcher has power to spare—or when he wants to borrow some from his neighbors, he uses a private line telephone to make the arrangements.

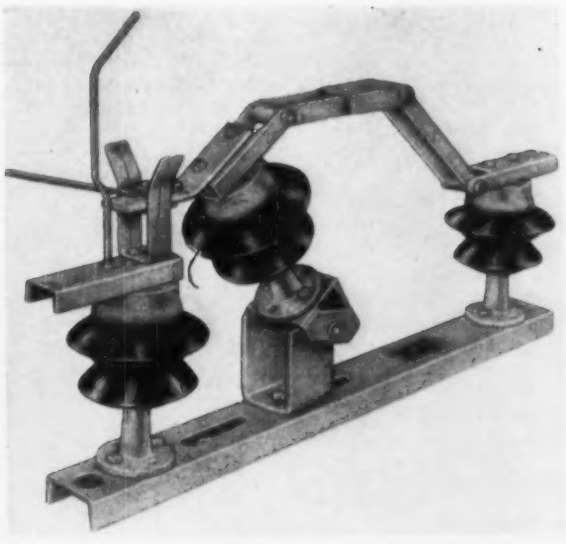
Bell System private lines connect his operations center at Kirkland, Wash., with Northwest Power Pool headquarters at Spokane. Many Washington and other Northwest utilities are members of the pool.

Puget's dispatchers call hourly to report their demand, output and excess energy. This co-operation insures that all the region's power is utilized to make more low-cost energy available to people.

Efficient operation, smooth co-operation — both require dependable communications to keep costs down. Call your Bell Telephone Company business office, and our representative will be glad to help you study your requirements at no cost to you.

BELL TELEPHONE SYSTEM

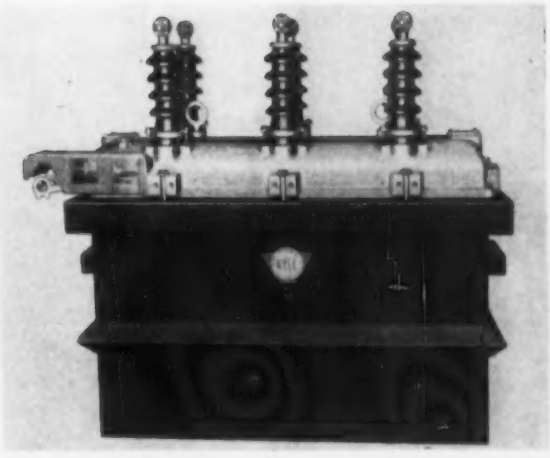
PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER • DATA TRANSMISSION SYSTEMS
CHANNELS FOR: REMOTE METERING AND CONTROL • TELEPHOTOGRAPH • CLOSED CIRCUIT TV



Tilting Insulator Switch

(18) *R&IE Equipment Division, I-T-E Circuit Breaker Co., Greensburg, Pa.*

This company has eliminated the flexible braid connector from its tilting insulator switch by providing pressure loaded, annular silver-to-copper bearing surfaces at all hinged points of the pantograph. The new switch features high pressure contacts and silver plated hard drawn copper to beryllium copper at the jaw. This is the only make-and-break contact. Terminals are channel-shaped copper and are hot-dip tinned.



Oil Circuit Recloser

(19) *Line Material Industries, 700 W. Michigan St., Milwaukee 1, Wis.*

This manufacturer reports the marketing of the first 200-mva oil circuit recloser available to the electric power industry. The new three-phase recloser has been designed for application in substations or on heavily loaded feeders where high fault currents may be expected. Accessories are offered that enable use of the recloser as a remote controlled circuit interrupting device. Load current ratings are 100, 140, 160, 185, 225, 280, 400 and 560 amp at 2.4 through 14.4 kv. Interrupting capacities are 12,000 rms symmetric amperes maximum at 4.8 kv and 8,000 rms symmetric amperes maximum at 14.4 kv. Clearing time is 2½ cycles or less. BIL is 110 kv.

Phase Converter

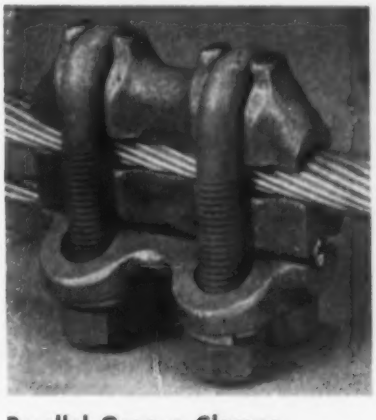
(20) *Kato Engineering Co., 1415 First Ave., Mankato, Minn.*

This new converter, which weighs 39 lb. changes single-phase, 115-v. 60-cycle a-c current to three-phase, 230-v, 60-cycle current. Features include vibration dampeners; capacitor starter and output and input receptacles within the aluminum-alloy frame. Other models will soon be available.

Voltage Tester

(21) *Rick Inc., 2210 Hampton Road, Erie, Pa.*

Called Tip Tester, this new device tests a-c or d-c voltage from six to 250 v as a single-pole tester. On d-c it indicates polarity. It clips in the pocket and has no wires. For voltage above 250 and up to 500, an extension is supplied as shown in photo inset, converting the device to a bipolar tester.



Parallel Groove Clamps

(22) *Burndy Corp., Norwalk, Conn.*

New sizes of heavy-duty parallel-groove clamps have been added to this company's line. They are said to be designed to make relatively small taps from large runs in primary and secondary distribution systems. Clamps can connect aluminum, copper or ACSR, according to the manufacturer.

Demountable Borer

(23) *Highway Trailer Co., 405 E. Fulton St., Edgerton, Wis.*

In the development stage now is a demountable earth boring machine that is expected to be able to dig holes nine to 30 in. in diameter to a depth of 10 ft in any soil condition. It is equipped with an integral winch and derrick to handle pole-setting operations. When not in service, it can be removed to leave the vehicle free for other use. It is powered with a 56-hp hydraulic fluid motor.

Moistureproof Ballast

(24) *Jefferson Electric Co., Bellwood, Ill.*

A new line of mercury lamp ballasts developed by this manufacturer is described as being absolutely impervious to any moisture damage in pole base installations. Key to the new product's moisture-proofing is said to be Aqualift Sealant, a development of the company. Testing was done in and out of water, including complete submersion, without failure, is the report.

Fire Alarm System

(25) *Edwards Co., 90 Connecticut Ave., Norwalk, Conn.*

A completely automatic fire warning and locating unit for homes and businesses is announced by this company. Equipment includes a power unit, indicator panel, a bell housed in the main panel, an interior extension bell and heat detectors. Detectors are UL listed and are automatic, self-contained and self-restoring. They are located on ceilings of all fire hazard areas. Presented as an item opening up a new market for electrical contractors, Zonalarm is said to be easily and profitably installed in either new construction or existing structures. Components are pictured.

Floor Box-Receptacle

(26) *Thomas & Betts Co., 36 Butler St., Elizabeth, N. J.*

A new combination floor box-receptacle design that gives contractors a choice from nine different standard receptacles to match both wiring system and plug-in equipment has been developed by this company. Accommodating any one type of the nine different receptacles, the new floor box line is said to meet all outlet needs, including those of equipment with heavy loads and varied operating currents. Receptacles can be replaced with another style when necessary.

Bumper Signs

(27) *Bumpa-Tel Sign Co., Box 181, Mounds, Ill.*

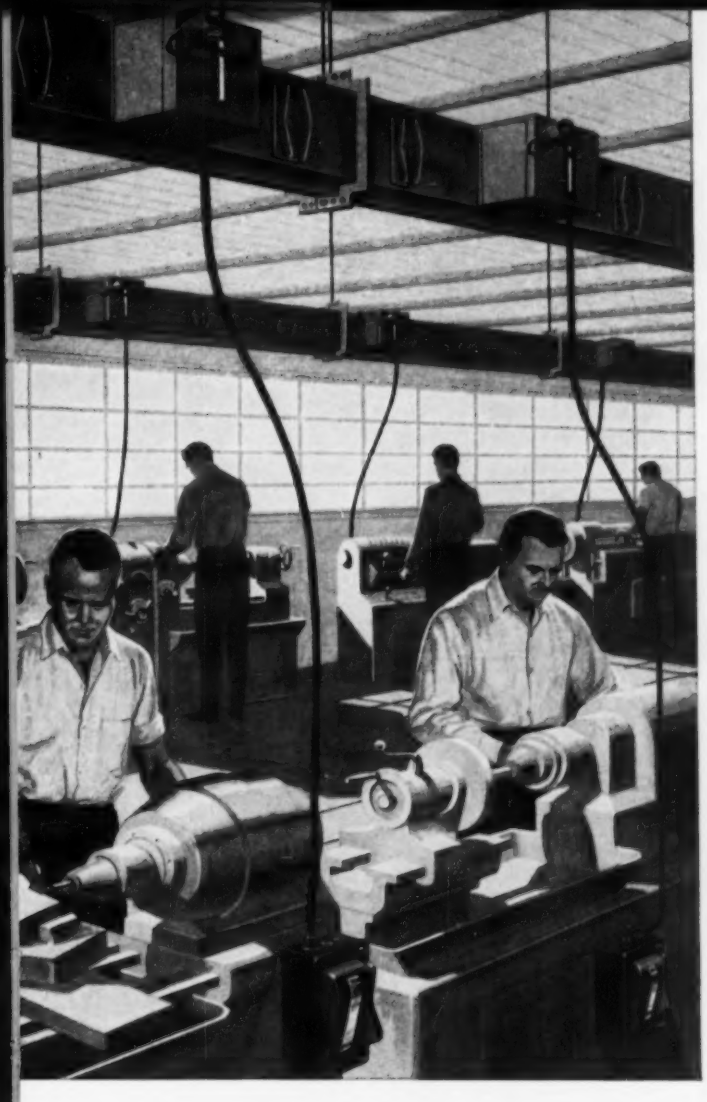
This company has designed an auto sign that can be mounted or dismounted in seconds after the original installation, which is said to require about 30 minutes. The frame is constructed of heavy polished aluminum tubing; sign panel of 20-gage sheet steel with baked enamel finish. The advertising message can be in enamel colors or Scotchlite. Installation does not mar the auto, the manufacturer reports.

Insulated Wire

(28) *National Electric Products Corp., Gateway Center, Pittsburgh, Pa.*

A new type RHH 90 C-RHW 75 C heat and moisture resistant, rubber insulated and fibrous covered wire and cable is now available from this company. Designed for general use in wet or dry locations, it is UL listed for 600-v service in sizes 14 through 6 AWG.

Fill in the Coupon on Page 31



Standardized plugs are inserted easily, securely and safely at conveniently spaced plug-in openings—one plug-in opening to every foot of duct. Reinforced fingers insure positive pressure contact. Seven types of plugs are available.

Your BullDog field engineer will be most happy to give you complete details on Plug-in Duct, Lo-X® Duct and the many other BullDog products. You'll find his electrical know-how very helpful whether you plan a new system or intend to expand or modernize existing facilities.

Plug in new circuits—cut expansion costs!

Stepped-up production usually demands extra power—but advance planning keeps expansion costs right in line. With a BullDog distribution system, new circuits to serve increasing demands are as close as BullDog Plug-in Duct. You simply plug in extra power when and where you need it—make a safe, convenient connection in minutes, without even interrupting the flow of current! There's no downtime for rewiring, no waiting for the power you need!

See your electrical contractor or the BullDog field engineer—learn how a co-ordinated BullDog distribution system, from safety switches to unit substations, provides full efficiency, safety and the flexibility that means economical expansion.

© BEPCO

IF IT'S NEW...IF IT'S DIFFERENT...IF IT'S BETTER...IT'S

BULLDOG

ELECTRIC PRODUCTS COMPANY

A DIVISION OF I-T-E CIRCUIT BREAKER COMPANY

BullDog Electric Products Company, Detroit 32, Michigan • A Division of I-T-E Circuit Breaker Company • *Export Division:* 13 East 40th St., New York 16, New York. *In Canada:* BullDog Electric Products Company (Canada), Ltd., 80 Clayson Rd., Toronto 15, Ontario.

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

COAST ELECTRIC & MANUFACTURING CO.
1733 N.E. Seventh Avenue, P.O. Box 7712
Portland 12, Oregon

YOUNG ELECTRIC & MFG. CO.
2134 Curtis St.
Denver 2, Colorado

SAFETY SWITCHBOARD COMPANY
910—89th Avenue
Oakland 21, California

BULLDOG ELEC. PROD. CO. OF LOS ANGELES
2885 E. Washington Blvd.
Los Angeles 23, California

Your Westinghouse representative can prove...

6 MAJOR TRANSFORMER IDENTIFICATION IMPROVEMENTS

Simplify selection, maintenance, inventory, load monitoring. New serial and style numbers on larger nameplate give complete transformer description instantly. Protective link and LV lead identification, new kva Vinyl-Cal and offset breaker handle identify 20% greater overload capacity . . . all measurable in operating dollars saved.

J-70795

YOU CAN BE SURE...IF IT'S

Westinghouse

F. T. Hausle, Distribution Design Engineer of Long Island Lighting Company, one of the three utilities who did experimental engineering and field load testing of both old and new Type CSP® transformers, agrees with Tom Oliver, Westinghouse representative, that "positive identification has always been significant in resolving operating, purchasing and engineering problems of transformer use."

BULLETINS ETC.

(29) MATERIALS HANDLING—Clark Equipment Co., Industrial Truck Division, Battle Creek, Mich., has published an illustrated catalog devoted to its complete line of fork lift trucks, straddle carriers, powered hand trucks and towing tractors.

(30) FILM CATALOG—A new booklet titled "Westinghouse Sound Films" is available from Westinghouse Electric Corp. It lists 47 films on various subjects that are available without charge from the company. Write for booklet B-7077, Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

(31) POWER SWITCHING—Line Material's new line of vertical-break power switches is described in bulletin PSE2. Operating, electrical and mechanical features making the switches applicable to high-voltage transmission circuits are given. Write to Line Material Industries, 700 W. Michigan St., Milwaukee 1, Wis.

(32) PLUGMOLD SYSTEMS—Five Plugmold systems and accessories are described in a circular published by the Wiremold Co., Hartford 10, Conn. Applications in homes, factories, offices and other places are shown. Size and capacity of each system is given. Ask for form 592.

(33) EXPLOSION HAZARDS—To locate the hidden probabilities of electrically ignited explosions in plants, a Hazard Finder is available from Crouse Hinds Co., Wolf & 7th N. St., Syracuse, N. Y. Address requests to Hazard Finder, Department HF, at the company address.

(34) ESTIMATING AID—Estimatic, a new electrical estimating system devised by Ralph E. Johnson of Sturgeon Electric Co., Denver, is described in a brochure available from the company. Write for the brochure to Estimatic Corp., 300 Vallejo St., Denver 23, Colo.

(35) PLUG-IN BUSWAY — A plug-in busway, designed primarily to serve as feeder for lighting and power loads, is the subject of a revised 20-page bulletin issued by General Electric's distribution assemblies department. Write to Advertising & Sales Promotion, Distribution Assemblies Department, General Electric Co., Plainville, Conn.

(36) ELECTRICAL CONNECTORS—How electrical connectors have been engineered for supervoltage service with aluminum conductors is discussed in a technical news letter by Burndy Corp. Address requests to the company at Norwalk, Conn.

(37) DISTRIBUTION TRANSFORMERS—A new 16-page bulletin, "Distribution Transformers for Rural and Industrial Substations," has been released by Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis. It includes a complete summary of weights and dimensions along with outline drawings and EEI-NEMA standard accessories for the various sizes. Ask for 61B6014C.

(38) MOTOR STARTERS—Allis-Chalmers' complete line of motor starters and contactors in sizes four, five and six, 50 to 400 hp, is described in a bulletin now available. Ask for 1488615, Allis-Chalmers Mfg Co., 1126 S. 70th St., Milwaukee 1, Wis.

(39) ELECTROMAGNETIC CONTROLS—Seven new electromagnetic control catalogs have been published by Automatic Switch Co., 50-56 Hanover Road, Florham Park, N. J. The catalogs are devoted to transfer switches, remote control switches, magnetically held contactors, relays, solenoids and plant controls. The seventh publication is a complete catalog of all the above.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after October 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

If described in advertising, fill in page number

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

NAME ..... TITLE .....

COMPANY .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Here are answers to your everyday questions on

ELECTRIC UTILITY

- rate fixing
- rate modification
- rate comparisons

Here is a comprehensive, practical treatment of the problems of establishing utility rates, covering everything from the economic nature of the utility to the fine points of actual rate making. The effects of profit objectives, customer service and satisfaction, and technical and regulatory influences are emphasized throughout, in an authoritative and clearly written guidebook.

Just Published

Electric Utility Rate Economics

By RUSSELL E. CAYWOOD
Manager of Rates, West Penn Power Co.

235 pages, 60 charts, tables, diagrams. $10.00

HERE is a book for the power salesman, the utility lawyer, the experienced rate man and others, bringing them the complete story of electric utility economics, from technology to metering. Its fifteen chapters cover the background of the industry; technical factors influencing price structure; the mechanics of rate making; short-cut methods for estimating effects on revenue of price changes; pointers on developing a rate modification program; rate case decisions to help you understand today's regulatory thinking; ways and means of determining the economic relationship of several engineering problems; the how and why of metering, metering economics and load control. Here is comprehensive information for all concerned with the place of rates in utility economics and with sound methods of rate making.

Includes a number of diagrams and tables to give you clear-cut visualization of

Revenue dollar disposition
Trends of prices and electric rate
Service charge vs. the minimum charge
Instantaneous peak provisions
Variation of cost with metering voltage and load size
Thermal meter characteristics
Depreciation accrual patterns
Break-even point
And other factors

MAIL THIS COUPON

10 DAYS' FREE EXAMINATION

McGraw-Hill Book Co., Dept. West-8-57
327 West 41st Street, NYC (36)

Send me Caywood's ELECTRIC UTILITY RATE ECONOMICS for 10 days' examination on approval. In 10 days I will remit $10.00 plus few cents delivery or return book postpaid. (We pay delivery if you remit with this coupon—same return privilege.)

(Print)
Name .....
Address .....
City ..... Zone ..... State .....
Company .....
Position ..... E WEST 8-57

For price and terms outside U. S., write McGraw-Hill Int'l., N. Y. C.

Great advances in gasoline come first from Standard

Chevron Gasolines are *unsurpassed*

preferred 2-to-1 over any western brand!

Whether you operate a large fleet or only a few vehicles, it will pay you to try new Chevron Gasolines, for power and smoothness . . . for greater gas mileage . . . for all-around performance.

Our highest octane ever! No other gasolines can give car, truck and bus fleets all the performance features of New Chevron Supreme and Chevron "regular". These new gasolines bring peak power, smooth ping-free response to all types of engines.

Detergent-Action in both gasolines actually cleans carburetors while engines operate . . . increases mileage . . . ends the biggest single cause of engine repair bills.

Aviation Anti-knock Blend in new Chevron Supreme vaporizes knock-creating deposits . . . delivers extra power, livelier response when you need it most.

Try one of these new Chevron Gasolines in your fleet, and you'll understand why they're preferred 2-to-1 over any other western brand. Available at all Standard Stations and Chevron Dealers, or call your local Standard Representative for bulk delivery to your terminal.

CHEVRON GASOLINE

CHEVRON SUPREME GASOLINE

TRADEMARKS "CHEVRON" AND "CHEVRON" DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA

AUGUST 1957

ELECTRICAL WEST SALES GUIDE News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

Country store at the Mart

The old West was brought back for a night when appliance, radio and TV exhibitors staged their country store, Wednesday feature at the San Francisco summer market, July 24. This unusual event put life into an otherwise slow market week for appliance men; brought out dealers to see what was going on and get a chance at prizes from the cracker box drawing. Cowboy cutouts, old-time signs, saloons and a real live mayor (A Cameron Ball, general manager of the Western Merchandise Mart) helped create the illusion. Exhibitors brought dealers into their booths to receive the prizes; some of them offered specials to stimulate orders during the evening.

Dealers tie in

Early reports from the refrigerator-freezer campaign being conducted by PG and E and Northern California Electrical Bureau indicate that more than 1,000 dealers are taking part. Meanwhile NCEB is readying two big drives for the fall—a second set TV promotion during September and a laundry promotion in October. Incentives are a part of each campaign. There is a customer jingle contest for the freezer promotion; cash prizes for bureau units taking part in the TV campaign; Las Vegas trips for enterprising salesmen in the laundry promotion.

Budget billing for heat

In connection with its promotion of electric heating (see p 110), Washington Water Power Co. has developed a budget billing plan. As worked out by Allen Elder, treasurer, the plan permits customers to equalize the low bills of summer with the higher bills in winter, when heating requirements are at a peak. The power company also is financing purchase and installation of water heaters on a plan similar to the one for wiring. Customers who purchase either new or replacement water heaters complying with WWP's specifications can finance them ($350 maximum) over a period of 36 months. No down payment is required and monthly minimum is $3, which is added to the service bill.

Slender profile

Hotpoint's 1958 TV line was being shown in the West last month. In Los Angeles Hotpoint Appliance displayed the "Slender Profile" models at the Hollywood Roosevelt, with Robert Koehler, TV

sales manager, in charge. At San Francisco Graybar staged an elaborate showing at Bimbo's, where more than 150 northern California dealers were treated to dinner and a French Follies show. Frank Tierney, export-import representative, wearing a red football suit, advertised the fact that any dealer purchasing 18 TV sets would receive a season ticket to the 49ers games—two season's tickets if he bought 25 sets. A repeat performance of the San Francisco preview was held in Sacramento.

Closed-circuit showing

G-E introduced its 1958 laundry and TV lines at a closed-circuit telecast beamed to some 40 cities. New portable appliances, including the spray-steam and dry iron, were shown in an earlier telecast. (See p 116.)

Laundry line

Frigidaire dealers throughout the West saw the new laundry products last month in showings that combined stage and screen techniques. Five full color films were integrated into live stage presentations, with lyrics and music written specially for the show.

TV Week

National Television Week, Sept. 8-14, will kick off an autumn public relations and advertising program. Co-sponsors are NARDA, RETMA, Television Bureau of Advertising, Radio-Electronics-Television Manufacturers Assn.

New quarters at Los Angeles

Hotpoint Appliance Sales Co., Los Angeles, is planning to move to a G-E building at 212 N. Vignes St., where it will have some 70,000 sq ft of newly remodeled offices and warehouse space.

Three under one roof

Bressie Electric Co., pioneer contractor and appliance dealer of Portland, has concentrated all operations in 26,000 sq ft at 1405 S. W. Alder. The move brings together three companies: Bressie Electric, retailer of lighting fixtures and small appliances; Bressie Appliance, repair shop; Bressie Electrical Constructors, the contracting firm. Carl Bressie, son of the founder, heads the business.

New distributor setup

T. Bert Newby, northern California district manager for Westinghouse Appliance Sales (WESCO division created to handle distribution of major appliances, TV room air conditioners and vacuum cleaners), has announced appointments. With headquarters in San Francisco, the district takes the place of former supply company branches there and in Oakland, Fresno and Sacramento. Richard B. Cook comes from Fresno to be sales manager of major appliances. John P. Adams was transferred from Los Angeles as sales manager of television, room air conditioners and vacuum cleaners. Rolf A. Hough, who has been consumer products sales manager at Sacramento, will re-

main there as sales manager of the full line. Harold E. Hugo, who spent 10 years on the Pacific Coast before going to St. Louis as Southwest regional manager of portable appliances, is returning here as manager of sales promotion and sales training. Charles J. Mitten, in the San Francisco office since 1955, is sales manager of contact sales.

Service training center

A Frigidaire service and training center has been opened at the General Motors training center in Denver. The new setup will train high school graduates in refrigeration and air conditioning service under the nominal sponsorship of dealers but at no cost to them or the students. The center serves Frigidaire dealers in Colorado, Wyoming, Montana and New Mexico.

Expands

McCollum-Law Corp. of Denver, Westinghouse appliance distributor in Colorado, Wyoming and New Mexico since 1952, now has the distributorship for the El Paso, Tex., area. The new territory gives McCollum-Law the largest geographic area of any Westinghouse appliance distributor in the United States—more than 320,000 square miles. Roxie Pomarico, former manager of major appliance and TV sales in Denver and Albuquerque, will manage the El Paso branch. He will be assisted by Joe Gracey, who has been administrative assistant at the Denver headquarters. W. S. Law is president of the firm.

Goes to Los Angeles

C. Walton Larue, veteran electric heating engineer of Portland and the Northwest and Northwest sales manager for Wesix Electric Co., has been named director of Wesix sales for southern California, Nevada and Arizona, with headquarters in Los Angeles. Succeeding him in the Portland office will be Frank Hunsaker, Wesix sales engineer since 1945.

Heads firm

Bertram F. Given has been made president of Waste King Corp., Los Angeles, succeeding his father, Samuel Given, who continues as board chairman. Also from Waste King comes the announcement that Graybar, Los Angeles, has been made its distributor for disposers and dishwashers in southern California, and Robinson Distributing Corp. in Seattle.

About people

R. K. Burbidge, formerly with Sylvania, has been appointed Norge district manager in southern California and Arizona. . . A. L. McDonald Jr., with Westinghouse Air Conditioning Division since 1956, has been made western regional sales manager. . . Phillip Gough Jr. has joined Gough Industries. . . Ward Terry Co., RCA distributor at Denver, has appointed Robert G. Barnes as advertising and sales promotion manager. He formerly was with B. K. Sweeney Co.

Frank Falge's monthly progress report on

LIVE BETTER . . . *Electrically*

The word is out for 1958

Advance word indicates Live Better...Electrically will introduce a Medallion Home program in 1958 featuring minimum standards for lighting, wiring and electric appliances. Four strong pushes will also be featured. Details will be provided to utilities beginning shortly after Labor Day.

To participate in Live Better... Electrically

The score sheet now indicates more than 150 manufacturers will actively participate in the Live Better...Electrically program and intensify their use of the emblem and slogan. Thirty-seven of these manufacturers are located in the West.

79% recognize Live Better... Electrically

Washington Water Power's public recognition survey gave this result: 79% had seen LBE; 60% of those who had seen LBE identified it as sponsored by WWP or the electrical industry; 54% of those who had seen LBE said it meant having more electrical appliances. Live Better...Electrically made a much stronger impression on young than on older people.

It pays to advertise

In 1956 home building dropped, yet the appliance industry chalked up its biggest year. In the spring of 1957 home building was down drastically, appliance sales were down also, yet residential kilowatt-hour sales were up. Yes, advertising and promotion do pay.

"From where I sit clothes dry better electrically"

Electric clothes dryers will receive strong industry attention in September, October and November. EEI has available an excellent promotional kit featuring "From where I sit clothes dry better electrically." Live Better...Electrically repeats the theme in ad-kit No. 7 and will tie in with participation-type ads "Are you working too hard on Mondays" in Life, Sept. 16; Saturday Evening Post, Sept. 21 (also Housepower edition), and Better Homes and Gardens in October. For the first five months electric home laundry equipment was down 20% but competitive-type dryers were up 49%. Enough said?

An electrical "successor to the barbecue"

A new household appliance, an electric barbecue that is said to be the last word in broiling and barbecuing is now on the market. It's called the Electromatic broiler, "successor to the barbecue," and is manufactured by Stanthony Corp., 5341 San Fernando Road West, Los Angeles 39, Calif.

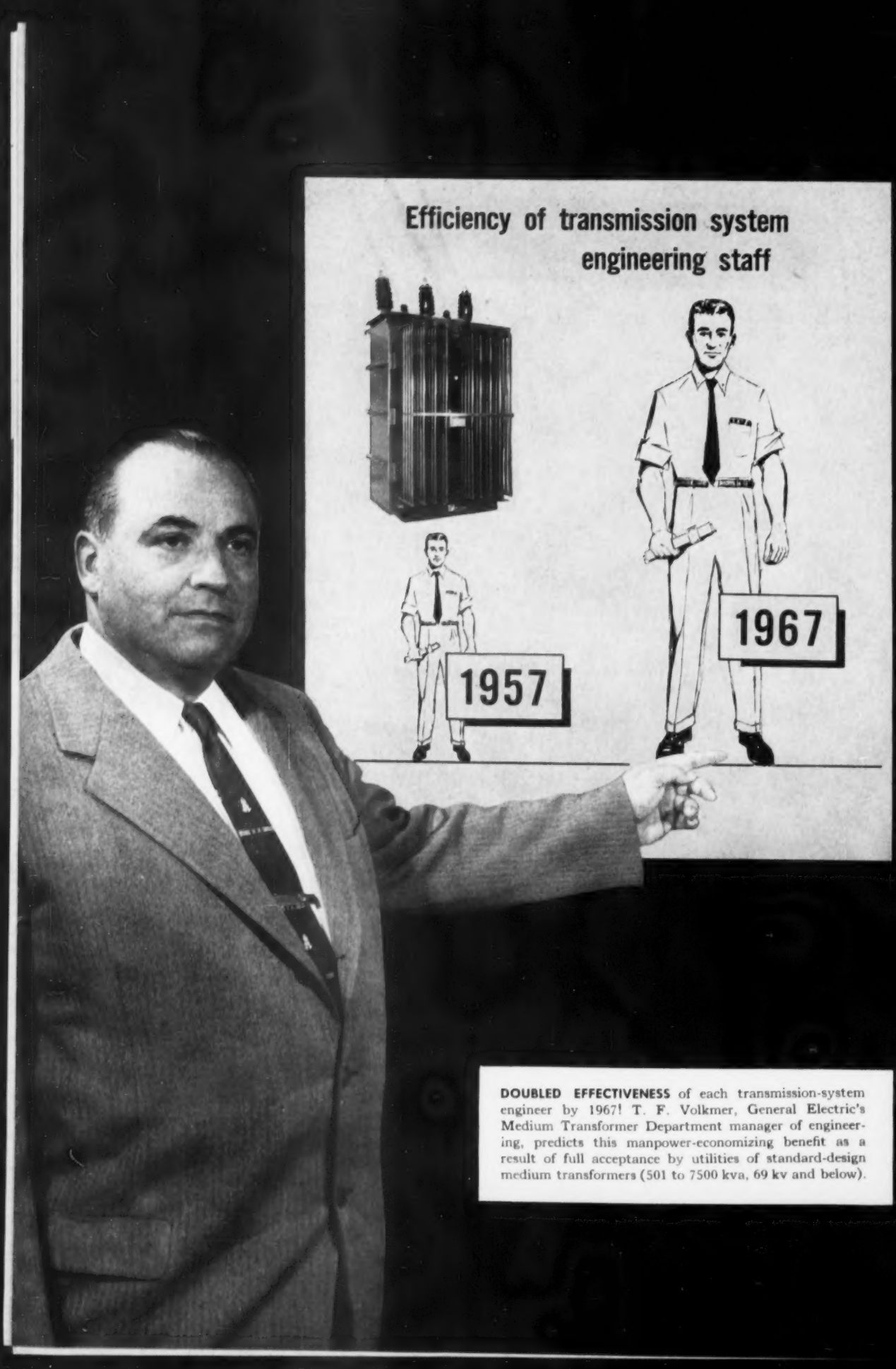
Closest to the ideal... a continuous length of wire ... is Burndy's efficient and practical approach to terminations. But the art of connection is far from simple... when you consider how Burndy achieves this in the tremendous variety of types and sizes to meet every modern connection need! And how can you select, from this huge resource, the connectors specially suited to your needs? That's easy. Burndy catalogs, field engineers and area representatives are at your command, if you say the word... BURNDY!

Ask for:
Industrial Catalog 52
Grounding Catalog G47
Compression Catalog Y53
Aluminum Building Wire Catalog AL54

57-4

BURNDY CONNECTORS

Norwalk, Connect. • Toronto, Canada • Other Factories: New York, Calif., Toronto • Export: Philips Export Corp.



DOUBLED EFFECTIVENESS of each transmission-system engineer by 1967! T. F. Volkmer, General Electric's Medium Transformer Department manager of engineering, predicts this manpower-economizing benefit as a result of full acceptance by utilities of standard-design medium transformers (501 to 7500 kva, 69 kv and below).

A GENERAL ELECTRIC 10-YEAR FORECAST:

Medium transformer standardization to double efficiency of transmission-system engineers

In 1967, electric utilities' transmission-system engineers will be largely relieved of medium-transformer design details; one man in this field will be as productive as are two today. Engineers will thus be freed for more challenging work, and utilities will be able to meet the future's heavier technical needs with fewer engineers than would otherwise be required. So forecasts T. F. Volkmer, manager of engineering at General Electric's Medium Transformer Department in Rome, Georgia.

What will make this greater productivity possible? This: utilities' continued acceptance and application of standard-design transformers. For, when standard-design units are adopted for all systems, only the most basic information (such as kva, high-voltage, and low-voltage ratings) will be needed to specify additional transformers. This simplified ordering procedure will relieve your valuable engineering personnel of time-consuming details of transformer design and specification.

YOU GET REAL BENEFITS TODAY!

You can realize the benefits of simplified ordering and reduced design time, *now*, by specifying General Electric RM (Repetitive Manufacture) transformers. These standard-design units also offer:

Faster shipment—Ten-week shipment is now average for General Electric RM medium transformers. This compares with an industry average of more than 16 weeks for specials.

More and better features—Standard design makes it economically possible for G.E. to offer such extras as Formex* insulated windings, control-center arrangement of instruments and accessories, reversible junction boxes, and many others.

Higher quality for longer life—G-E repetitive manufacture techniques permit 18 assembly-line tests and 22 quality-control inspections during manufacture, to assure dependable operation over a long service life.

G.E.'S BROAD RANGE OF STANDARDS HANDLES 90% OF ALL JOBS

If your company is not yet taking full advantage of the benefits of medium transformer standardization, act today. Ask your G-E Apparatus Sales Engineer to show you how G.E.'s broad range of standard RM medium transformers can meet the large bulk of your needs, and also work efficiently with older, special transformers now on your system. General Electric Co., Schenectady, N. Y. 416-11

*Reg. Trade-mark of General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC

YOUNGSTOWN "BUCKEYE" CONDUIT

. . . protects wiring system of Cleveland's new $5 million air terminal

Highly functional—yet strikingly impressive, describes the new Terminal Building at Cleveland's Hopkins Airport. It's part of an $8 million improvement program that will restore Cleveland's position of national prominence in the air transportation industry.

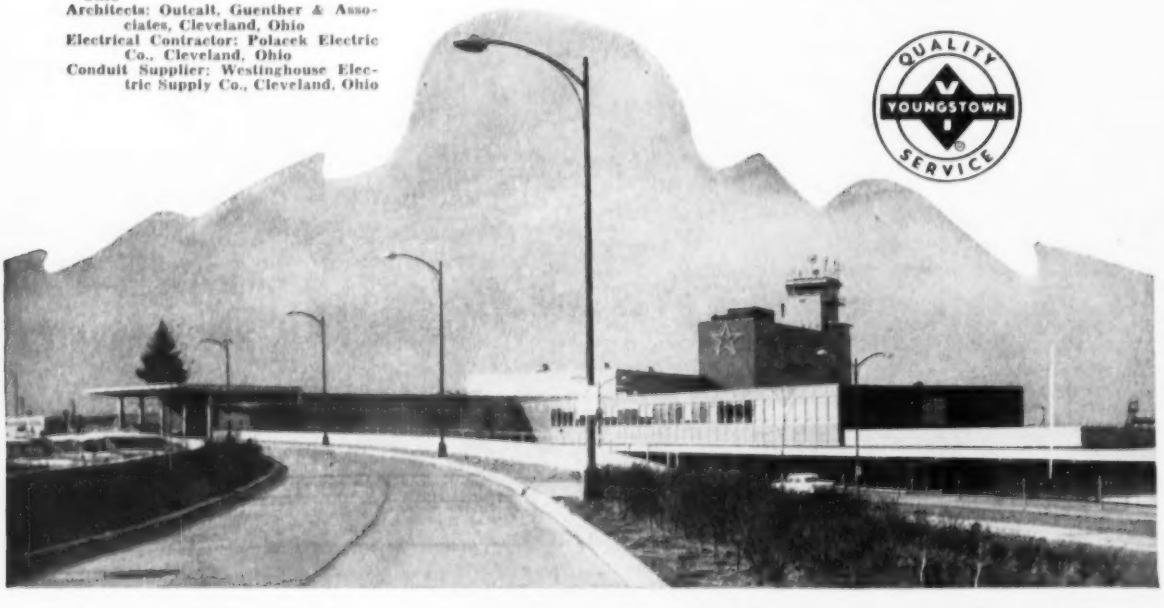
Planners of the airport's revitalization project wisely specified Youngstown's "Buckeye" Full-Weight Rigid Steel Conduit for life-time protection of the Terminal's all-important electrical wiring system. Electrical systems that fail to function properly are definitely a bad investment.

To keep your electrical systems functioning properly, specify quality-controlled Youngstown "Buckeye" Conduit. Satisfied users tell us, "It's easier to bend and thread — easier and faster to fish wires through, and due to its superior corrosion-resistance, gives a much longer, trouble-free service life."

"Buckeye" Conduit is the specification of many leading building owners, architects and contractors—why not make it yours, now?

Leading distributors in the industrial and electrical markets carry complete and ample stocks for on-the-spot delivery to your job sites. They're awaiting your phone call—today.

Cleveland Hopkins Airport: Cleveland, Ohio
Architects: Outcalt, Guenther & Associates, Cleveland, Ohio
Electrical Contractor: Polacek Electric Co., Cleveland, Ohio
Conduit Supplier: Westinghouse Electric Supply Co., Cleveland, Ohio



THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

He's doing maintenance for you!

New Epoxy Finish Eliminates Painting as a Factor in Capacitor Maintenance

The maintenance section in the Varex instruction bulletin is very short. The reason: there's hardly any maintenance required.

Painting is virtually eliminated as a factor because each Varex container gets three protective coatings — zinc spray, zinc chromate primer, and epoxy resin paint.

Epoxy is a new finish, proved superior to other resin-base paints on all counts . . . corrosion resistance, abrasion resistance, flexibility and adhesion.

Consider, for example, how epoxy performed under an accelerated salt spray test, with a five per cent salt solution. Paint A, an alkyd base paint ordinarily used for this class of electrical material, broke down after 166 hours. But Varex epoxy was still good at 1250 hours when the test was stopped!

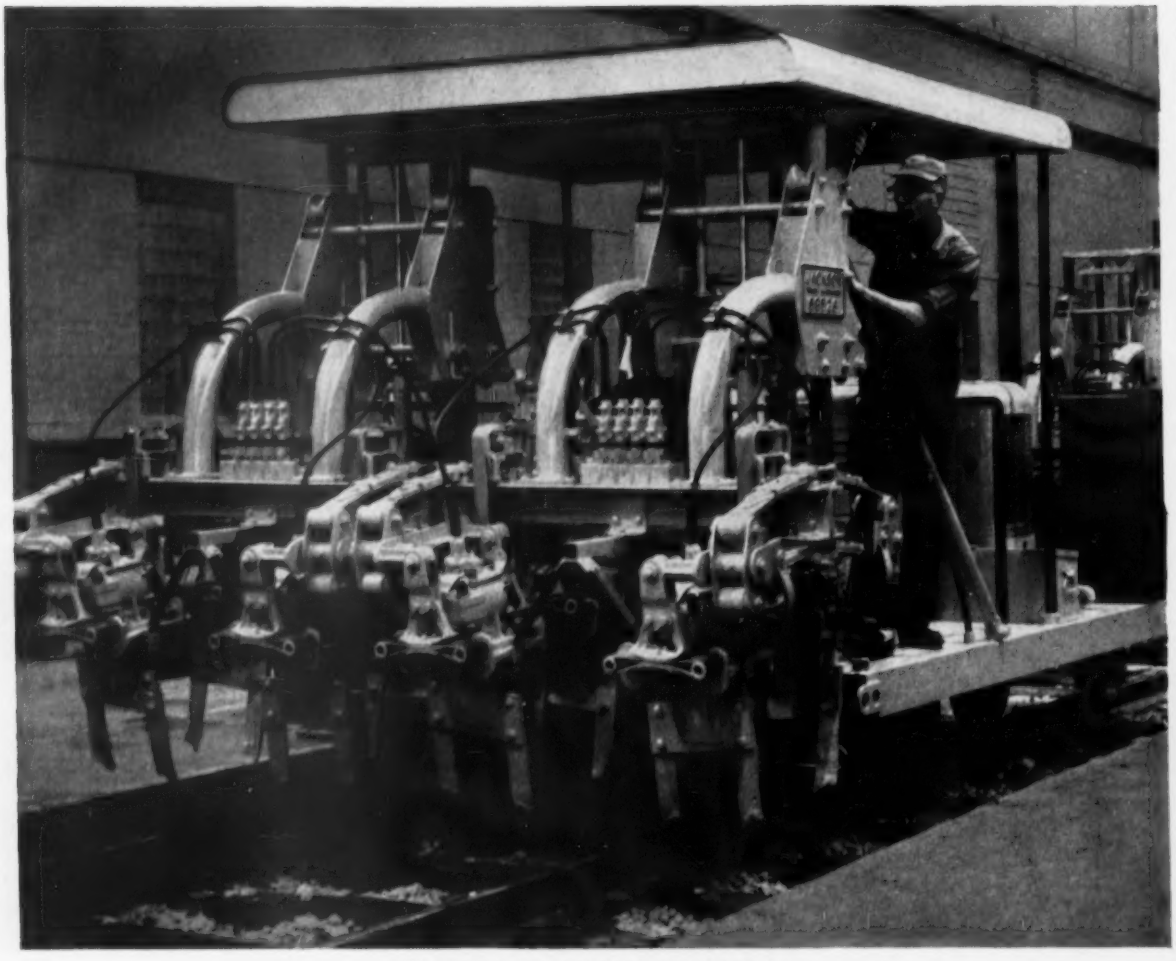
On the basis of such tests, we know the indicated life of Varex epoxy is several times that of any other paint now available for capacitor applications.

Use of epoxy paint is just one of several ways the makers of Varex are doing your capacitor maintenance for you.

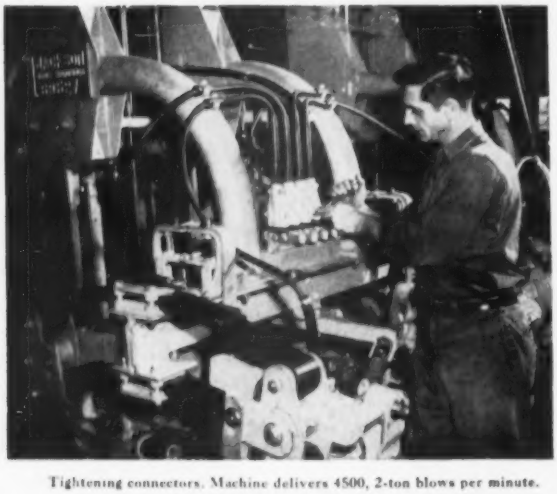
Ohio Brass

MANSFIELD, OHIO, U. S. A. 4761-H

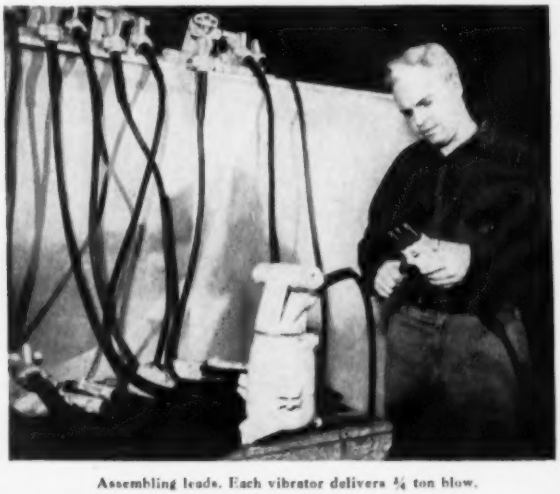
"Tiger Brand Amerclad is the most



The completely self-contained Jackson Track Maintainer.



Tightening connectors. Machine delivers 4500, 2-ton blows per minute.



Assembling leads. Each vibrator delivers ¼ ton blow.

durable cable we've ever used"

says **ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Michigan**

MANY years ago, the executives at Electric Tamper & Equipment Co. found out that when railroads order a piece of machinery, they expect it to last a long time—without breakdowns. Since then, Electric Tamper has won a high place in industry by producing a line of the hardest-working, *toughest* track maintenance machines on the market.

Leader of the line is the Jackson Track Maintainer, used for tamping ties. It has 8 powerful vibratory motors that drive 8 tamping assemblies. Each motor is powered with Tiger Brand Amerclad cable. The vibration and flexing (which are very severe) caused previous cable to crack until the jackets actually peeled away from the conductors. So they asked American Steel & Wire for advice.

Tiger Brand Amerclad was the solution. Finely stranded conductors soak up vibration and allow greater flexibility than ever before. The tough, well-cured jackets are impervious to oil, grease and the burning sun.

In the company's own words, "Tiger Brand cable is certainly superior to anything we have ever seen for this class of service. Its complete dependability under all service conditions has definitely helped us to maintain our good reputation in the field."

Do you want a *better* electrical cable—engineered for your equipment? Just call your American Steel & Wire representative.

The Jackson Multiple Compactor for consolidation of granular soil.

Hand Vibrospade. Cable usually drags on the ground.

Small compactor. See why they need durable cable?

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS - TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

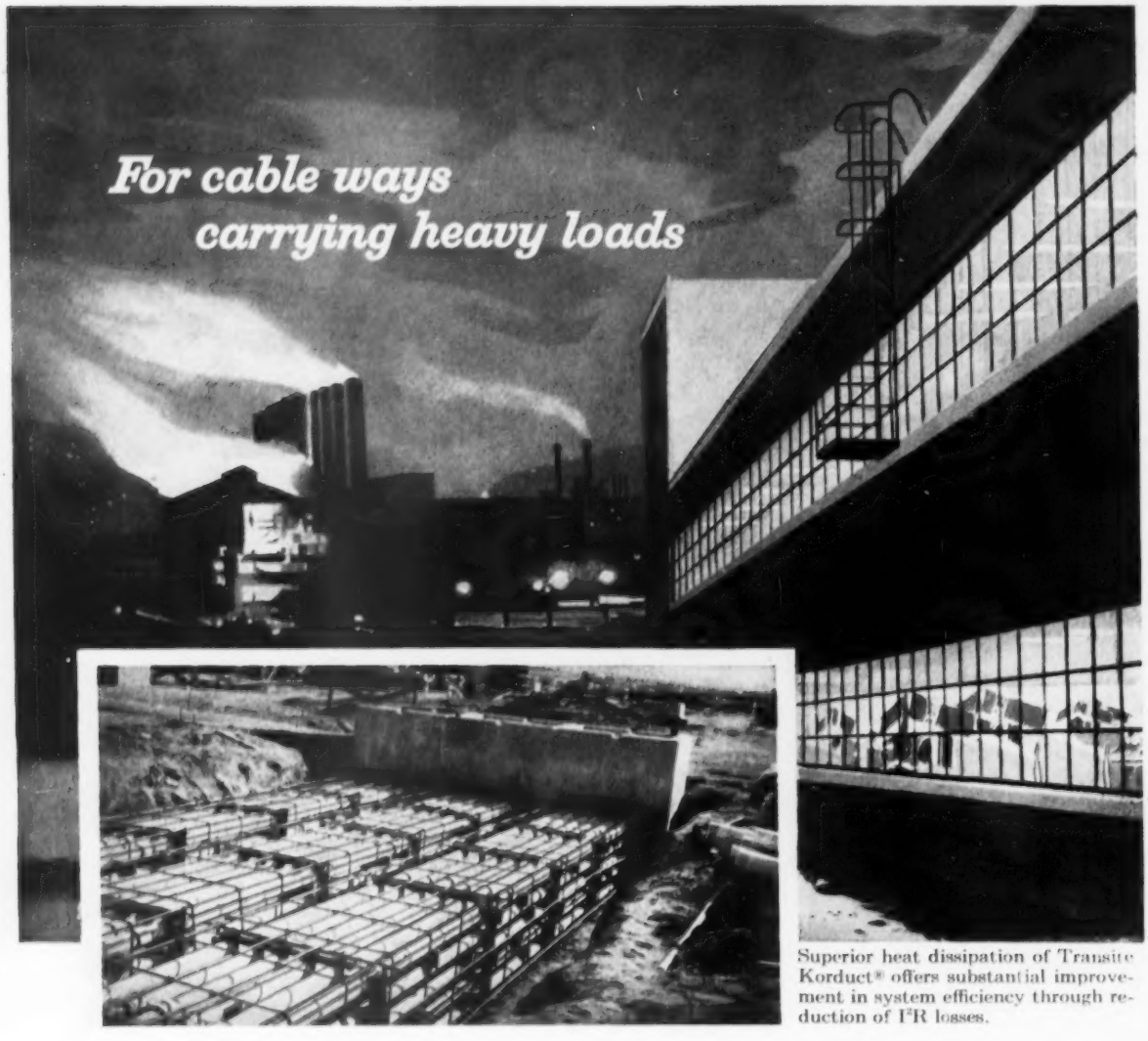
USS TIGER BRAND ELECTRICAL WIRE & CABLE

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- asbestos wire and cable
- mold cured portable cord
- shovel & dredge cable
- paper & lead cable
- varnished cambric cable
- interlocked armor cable
- special purpose wire & cable
- aerial, underground and submarine cable

USS

UNITED STATES STEEL



Superior heat dissipation of Transite Korduct® offers substantial improvement in system efficiency through reduction of I^2R losses.

J-M Transite® Ducts mean increased capacity—longer cable life—maximum return on investment

FINDINGS OF TESTS made at Johns-Manville Research Center and approved for presentation by AIEE Insulated Conductor Committee, show that J-M Transite Ducts dissipate heat of cables faster. The result is cooler cables under a given load . . . lower I^2R losses . . . longer insulation life from lower operating temperatures.

Transite Ducts offer many other advantages, too. Made of asbestos-cement, they are incombustible, resistant to corrosion, unaffected by electrolysis. Transite Ducts resist damage when arcing occurs. These durable, lightweight ducts provide complete and permanent cable protection, together with savings on installation and maintenance.

For complete details of tests and the many advantages of Transite Ducts, write for Brochure EL-29A, and J-M Cooler Cables story. Johns-Manville, Box 14, N. Y. 16, N. Y. In Canada: Port Credit, Ont.

JM Johns-Manville TRANSITE Asbestos-Cement DUCTS

J-M CONDUIT for direct buried banks and exposed runs—J-M KORDUCT® for concrete banks

"It's Everybody's Family Tree!"

The familiar utility pole might well be considered "part of the family". Through the years it has supported the wires that bring light, warmth, communication and labor-saving energy into every home.

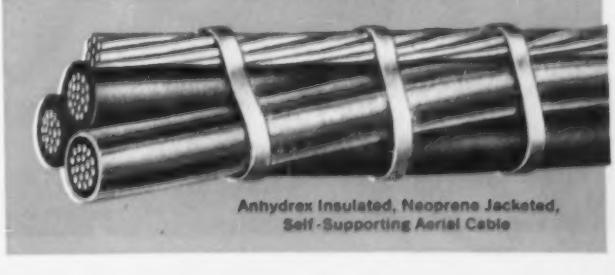
In countless locations, these wires are being supplanted by SIMPLEX SELF-SUPPORTING AERIAL CABLES, which have built an unmatched reputation for efficiency and dependability. For sixty-seven years, Simplex has pioneered in the design, development and manufacture of all types of aerial cables used for both communication and power distribution. The benefits of this specialized experience are yours for the asking. Write for Catalog 1006, which gives detailed information.

SIMPLEX WIRE & CABLE CO.,
79 Sidney Street, Cambridge 39, Mass.

LIVE BETTER ELECTRICALLY

Simplex

Wire sculpture by Henry Szafarz



Anhydrex Insulated, Neoprene Jacketed, Self-Supporting Aerial Cable

A bonus beyond the specification...
Actual test on this ASA standard 69 kv, 1200 amp, Type "S" bushing demonstrates the inherent strength of the solder seal design. Although not meant to handle physical stresses such as dead-ending, it will withstand the most severe shocks caused by short circuits with a generous margin of safety.

SOLDER SEAL . . . stressed to the ultimate without damage

For transformers and circuit breakers . . . durability like this can't "just happen" . . . it has to be planned

Engineered to withstand severe electrical, thermal and mechanical stresses, Westinghouse condenser bushings can take far more punishment than they will ever get.

The result of fifty years' field experience plus continuous research, Westinghouse Type "S" bushings needed no basic construction change to meet ASA standards.

Superiority has been proved in service with such features as:

Unequaled Mechanical Strength—provided by exclusive Westinghouse solder-sealed construction, together with one-piece, wet-process porcelain casing. This allows deflection under severe short circuit stresses without damage to sealed joints.

High Dielectric Strength, Low Power Factor—provided by numerous conducting foil layers, and generous thickness of high-grade insulating paper.

Extra Thermal Strength—assured by liberal conductor cross-section and low dielectric loss. High thermal capacity, no hot spots.

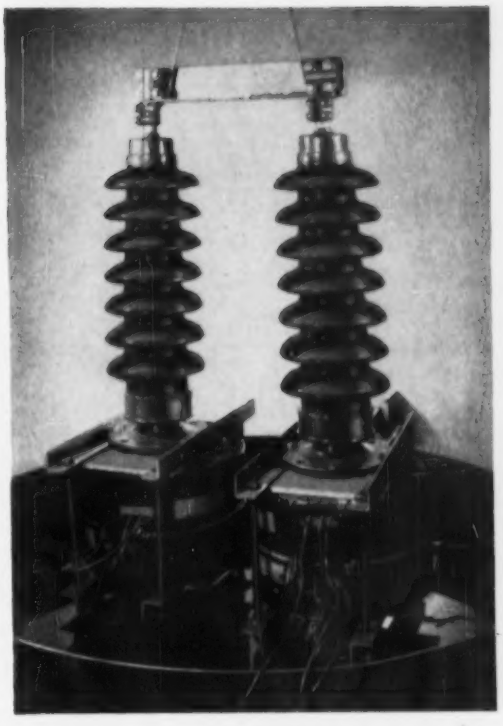
Absolute Sealing Against Moisture—provided by solder seal construction which eliminates gasketed joints. High-viscosity plastic filler gives additional internal protection by providing a positive bond which prevents voids at all temperatures.

Freedom From Corona—maintained by uniform voltage gradient and controlled by testing every bushing.

For complete information about Type "S" condenser bushings, call your Westinghouse representative . . . or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70815

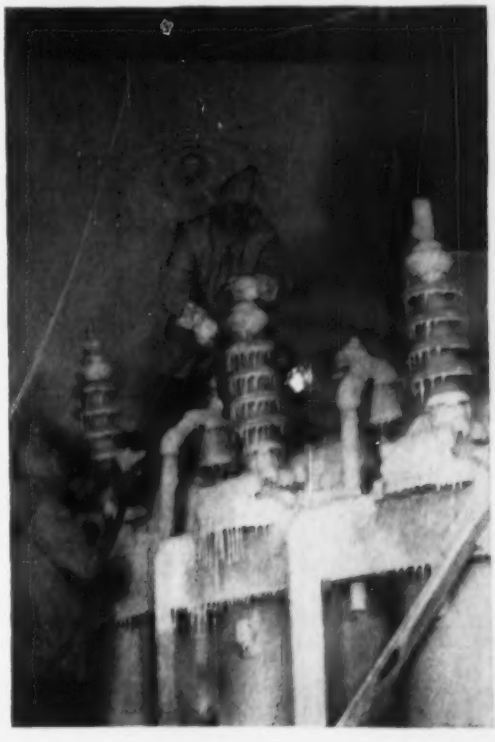
YOU CAN BE SURE . . . IF IT'S

Westinghouse



Exceptionally severe thermal stability test fails to decrease bushing strength. Tested by 12 hours immersion in hot oil at full rated current, one hour at twice normal voltage.

Work-worthy under any temperature extreme. In the Type "S" bushing, exclusive Westinghouse filler plastic eliminates voids at all points and at all temperatures down to -60°F.



in the long run... it's O.Z.

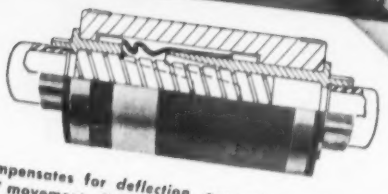
Type AX

Provides 4" expansion, contraction movement. Malleable iron head, body Hot Dip Galvanized. Weathertight head sealed by factory-installed high grade graphite packing. Insulating conduit end bushing eliminates cable abrasion. 10 sizes for conduit ½" to 4" diameters.

Type EX

Permits 8" conduit movement. Optional length sleeves, additional cost. Weathertight head sealed by factory-installed high grade graphite packing. Insulating bushings prevent cable abrasion. Hot Dip Galvanized finish. 13 sizes for ½" to 6" conduit diameters.

Type EXDS

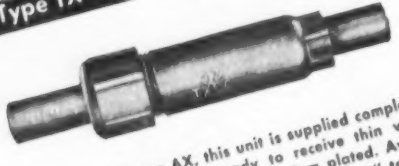


Compensates for deflection, expansion, contraction. ¾" movement all directions from normal; 30° angular movement. Also used as vibration damper between conduit sections. 10 sizes.

Type EXE

Weathertight end type expansion fitting. Designed for conduit terminating in junction box, where expansion, contraction take place. Supplied complete: locknuts, bushings. Standard finish, Hot Dip Galvanized. 13 sizes.

Type TX



Similar to the Type AX, this unit is supplied complete with extension nipples, ready to receive thin wall couplings. Standard finish is cadmium plated. Available in 6 sizes for conduit ranging from ½" to 2".

for the longer line of EXPANSION FITTINGS

In the long run, no line of conduit is more dependable than its components. When it comes to dependability in expansion fittings, look to O. Z. as the line that measures up! Five basic types provide the dependable answer to your fitting problems in conduit expansion, contraction, and deflection. O. Z. is the dependable line because it's the line with the *right size*, the *right type*, for every requirement!

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND STREET • BROOKLYN 17, N. Y.

- CAST IRON BOXES
- CABLE TERMINATORS
- POWER CONNECTORS
- SOLDERLESS CONNECTORS
- GROUNDING DEVICES
- CONDUIT FITTINGS
- INTERLOCKED ARMOR CABLE FITTINGS

Sales Office and Warehouse: 406 So. Cicero Avenue, Chicago 44, Ill. • ESterbrook 9-0326
Office and Factory: 749 Bryant Street, San Francisco 7, Calif. • GArfield 1-7846

ON THE LINE...

New Hubbard Faultmaster Keeps Pace With Growing Systems!

HUBBARD
Small bore single vent tube provides high pressure positive expulsion. Fibreglass reinforcing assures long tube life.

Proper application of fuse cutouts is greatly simplified by the use of the new Hubbard Faultmaster. The design leads the industry with a new single vent, small bore, fibreglass-reinforced fuse tube. Flippers, flying caps, tricky vents and other remedial accessories are not required. Without "blind spots," the Faultmaster is able to clear faults from a few amperes through its maximum rating. Future obsolescence can be avoided now, for the great flexibility of the Faultmaster provides superior protection for today's system and, without extra cost, has the built-in-reserve for operation on the system of tomorrow.

Unique, high strength recoil members and husky fasteners absorb, minimize and distribute the stresses of high fault interruption over the sturdy, solid porcelain column. The entire current path is silver plated and current transfer points are under spring pressure. Springs are made from non-aging materials and designed to operate well below their elastic limit to insure positive contact pressure throughout the useful life of the cutout. All working parts are of corrosion free non-ferrous materials. Get the full story today from your Hubbard distributor or write for a copy of Bulletin P-756.

HUBBARD AND COMPANY

Pittsburgh 1, Pa.
Chicago, Ill.
Oakland, Calif.
Plano (Dallas), Texas

New line of Alcoa heavy-duty, eliminates all loose parts

Three new extruded, parallel groove clamps handle #2 to 400MCM conductor—

Economically priced

Are your men always dropping or losing the nuts and washers from old-fashioned clamps? End fumbling loose parts. Here's the answer: Alcoa's new heavy-duty universal clamps—all loose parts have been eliminated. They can be applied without being taken apart.

These new clamps also reduce inventories. A newly developed universal groove design allows just three clamps to cover the full ACSR range from # 2 to 397.5MCM (18/1), stranded from # 2 to 400MCM. They're competitively priced heavy-duty clamps.

Top and bottom parts of the clamps are Alcoa® Aluminum Extrusions—made strong, solid, dense, with a heat-treated alloy. Being wrought metal, tapped bolt holes have strong threads. Bolts are anodized to reduce thread friction. All parts are aluminum to equalize expansion, eliminate corrosion. Grooves are specially treated and coated with No-Ox-Id.

Experience gained during a quarter century of making parallel groove clamps has been applied in designing these new heavy-duty universal clamps.

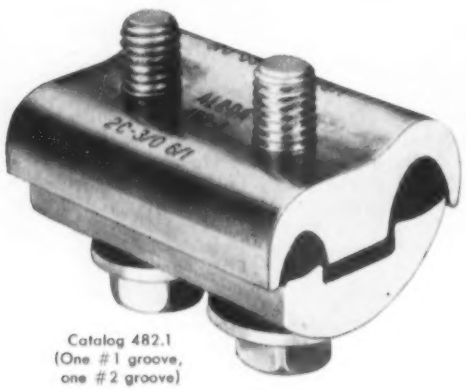
Months of extensive laboratory testing have proven these heavy-duty clamps. They have undergone 1,000 heat cycles using various conductor combinations; test current produced conductor temperatures of 200° F—without significant change in connection resistance.

Your Alcoa representative has samples of these clamps and full details. Let him show you how they can reduce your inventory, help on your connecting problems, make your men's work easier. Or write ALUMINUM COMPANY OF AMERICA, 2388-H Alcoa Building, Pittsburgh 19, Pa.

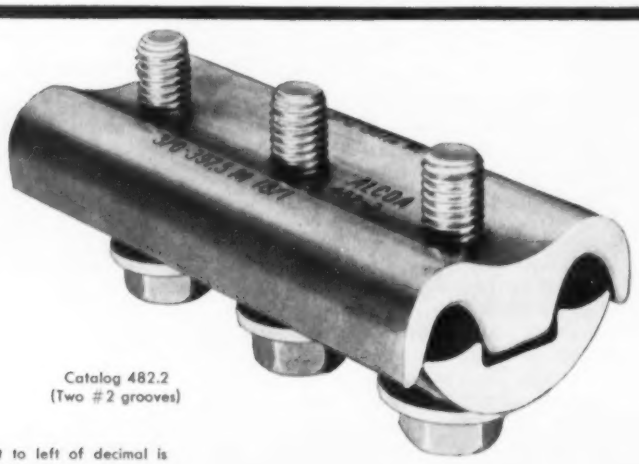
THE ALCOA HOUR—
Television's Finest Live Drama—Alternate Sunday Evenings

ALCOA ALUMINUM
CONDUCTORS & ACCESSORIES
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value



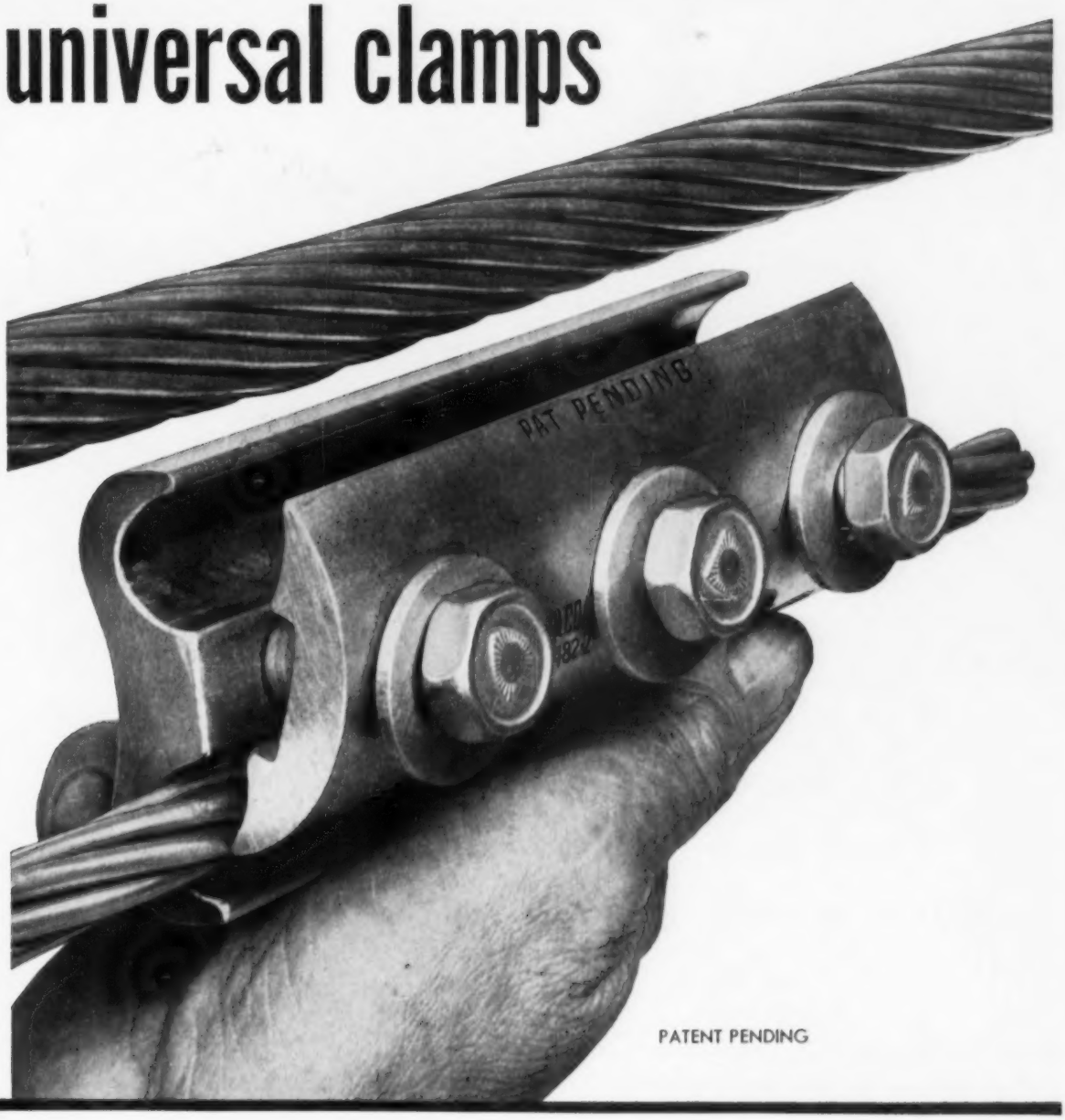
Catalog 482.1
(One # 1 groove, one # 2 groove)



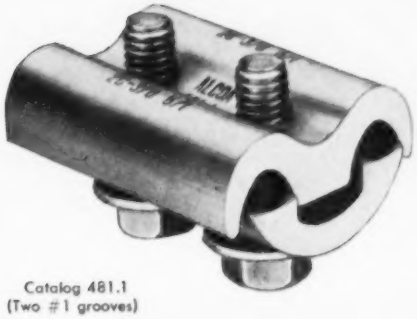
Catalog 482.2
(Two # 2 grooves)

Functional catalog numbers: digit to left of decimal is number of one groove; digit to right is other groove.

universal clamps



PATENT PENDING



Catalog 481.1
(Two #1 grooves)

RANGE OF CONDUCTOR FOR EACH GROOVE SIZE

Groove Size	Dia. Min.	Range Max.	ACSR Min.	ACSR Max.	Stranded Conductor Min.	Stranded Conductor Max
1	.292	.502	2 (6/1)	3/0 (6/1)	2	3/0
2	.464	.743	3/0 (6/1)	397.5MCM (18/1)	3/0	400MCM

(See captions under clamps)

DECIDEDLY BETTER
DAY-BRITE
Lighting Fixtures

Left to right: Oscar C. Lundberg, vice president, William J. Beran, chief estimator, and James S. Bullied, president, Capitol Electric Company, San Diego, Calif.

More profits than anticipated

"On jobs we engineer, we specify Day-Brite wherever possible. It's always a pleasure to have jobs check out with greater results than anticipated and we can only attribute this to the superior design features of Day-Brite lighting," says Oscar Lundberg.

"Day-Brite's ease of installation and time-saving devices add up to more profits for us. And we're assured our clients receive maximum results and performance from a quality product."

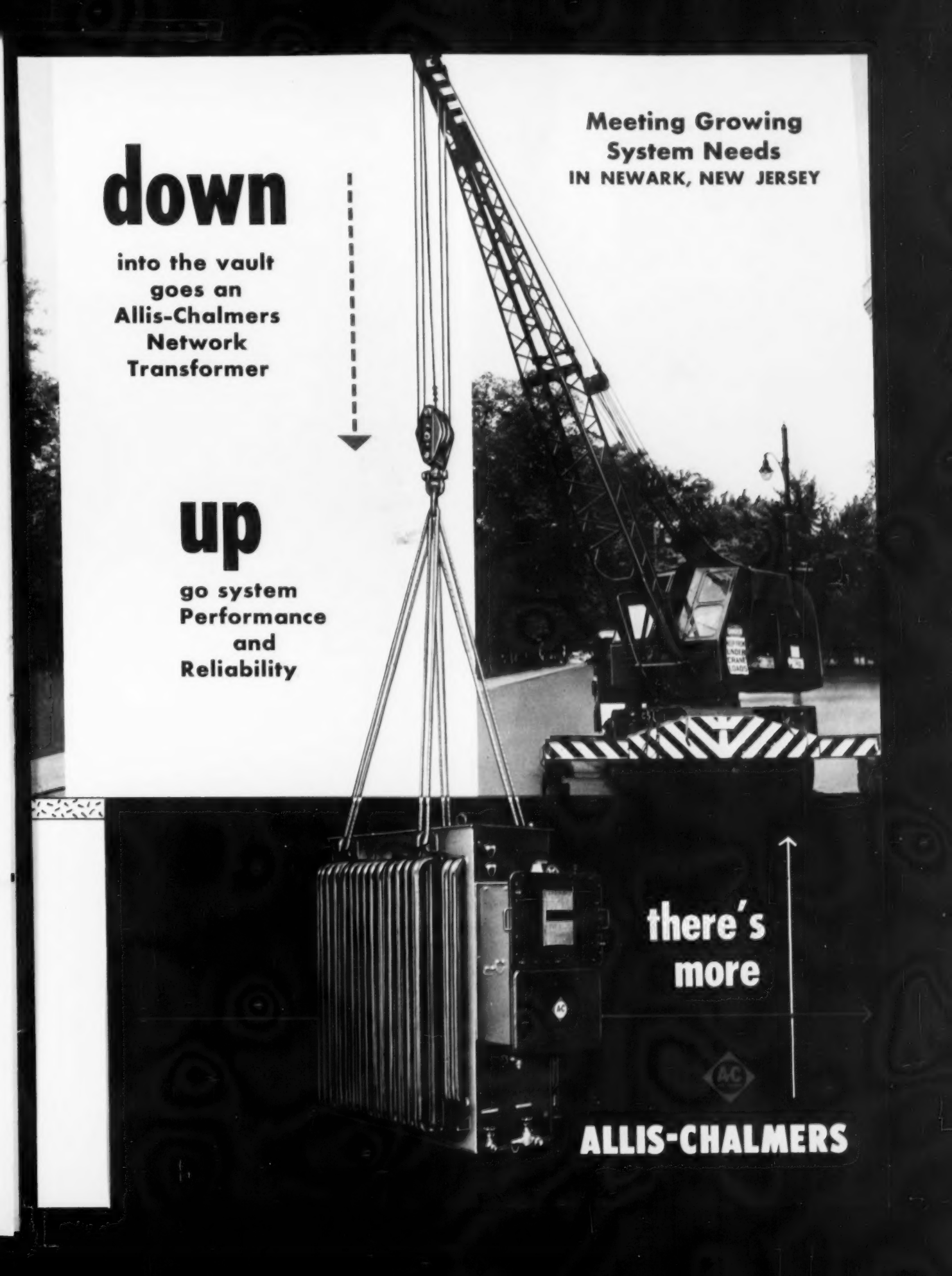
You can take it from Mr. Lundberg, Day-Brite is tops for quality, performance, appearance. And no other fixtures on the market are so thoroughly engineered for quick, simple, economical installation. In fact, you'd think they were actually designed by contractors.

Certified Lighting for a Better America

DAY-BRITE LIGHTING, INC., OF CALIFORNIA
530 Martin Ave., Santa Clara, Calif.

71195

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING FIXTURES

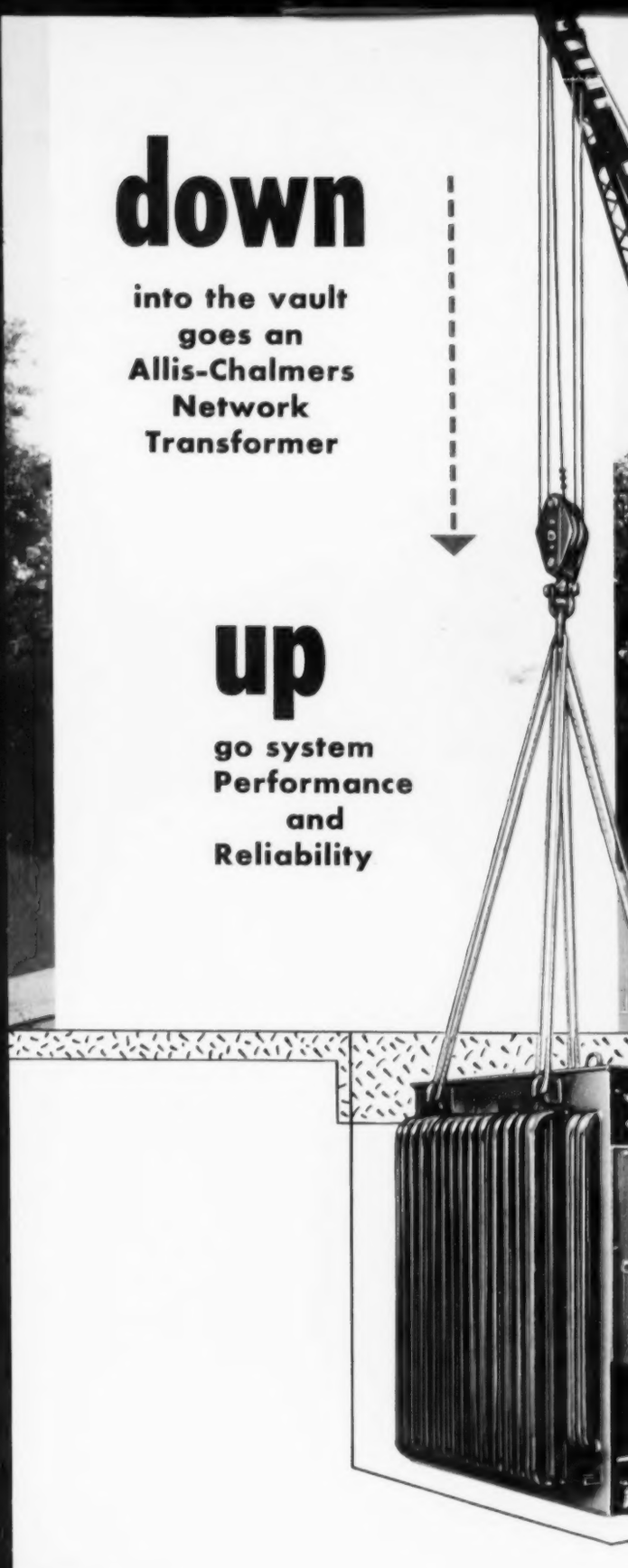

Meeting Growing
System Needs
IN NEWARK, NEW JERSEY
down
into the vault
goes an
Allis-Chalmers
Network
Transformer
up
go system
Performance
and
Reliability
there's
more
ALLIS-CHALMERS

down

into the vault goes an Allis-Chalmers Network Transformer

up

go system Performance and Reliability



ALLIS-CHALMERS NETW
The Choice of Utility

Air conditioning and other power demands are putting a squeeze on downtown network systems in city after city. To meet these acute load-concentration needs, Allis-Chalmers network transformers are being installed on many of the most important systems in the country. This wide acceptance, based on an outstanding record of performance, is your assurance of complete satisfaction when you modernize or expand with Allis-Chalmers power equipment.

ALLIS-CHA

Meeting Growing System Needs
IN NEWARK, NEW JERSEY

TWORK TRANSFORMERS—
ty Engineers Everywhere

putting
ty after
needs,
nstalled
country.
g record
satisfac-
halmers

To Meet Your Growing System Needs

It will pay you to investigate the many advantages of Allis-Chalmers network transformers . . . advantages that have merited the confidence of utilities and consultants everywhere. Get all the facts. See your Allis-Chalmers representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

HALMERS

A-C ALLIS-CHALMERS

A-5371

details...details...details

add Years to Transformer Life

Special Design of Bushing Seal

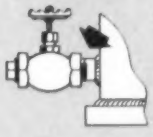
Spiral-wound metallic gaskets adjust to changing operating conditions . . . can be installed without grease or cement.

Protected Against Corrosion and Flooding

Tank surfaces are shot blasted and given three coats of baked-on phenolic base paint. Base and tubes are treated with a protective compound.

Major Gaskets Eliminated

Main cover and switch compartment are welded to tank. Oil sludging and oxidation are minimized.



Threaded Valve Connections

Connections are solder wiped for extra protection. Valves are located for easy access. Globe-type valves with nonrotating seats close tight, avoid wear on the valve seat.

ALLIS-CHALMERS

NETWORK TRANSFORMERS

Compact, Low-Loss Design—

Thermal capacities are high for contingency load conditions. Liberal ducts throughout both high voltage and low voltage coils assure ample circulation of cooling liquid.

Attention to detail, as exemplified by many design, construction and easy-maintenance features, has given Allis-Chalmers transformers an outstanding reputation for performance and reliability. Get the complete story. See your Allis-Chalmers representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

MEN RESPONSIBLE FOR

POWER DISTRIBUTION KNOW...

IF IT'S PARANITE IT'S RIGHT!

From Aerial to Underground Wire and Cable

Over a period of 67 years Paranite has steadily built a reputation for quality wire products and dependable service. Overhead . . . or underground . . . there's a Paranite cable specifically engineered to perform in excess of your requirements. SUPER-PARARITE® butyl rubber insulations have been developed to withstand conditions in your area. Copper or aluminum bare or weatherproof cables . . . ACSR or line wire (formerly products of Midland Wire Corporation) are also available.

PARANITE WIRE AND CABLE

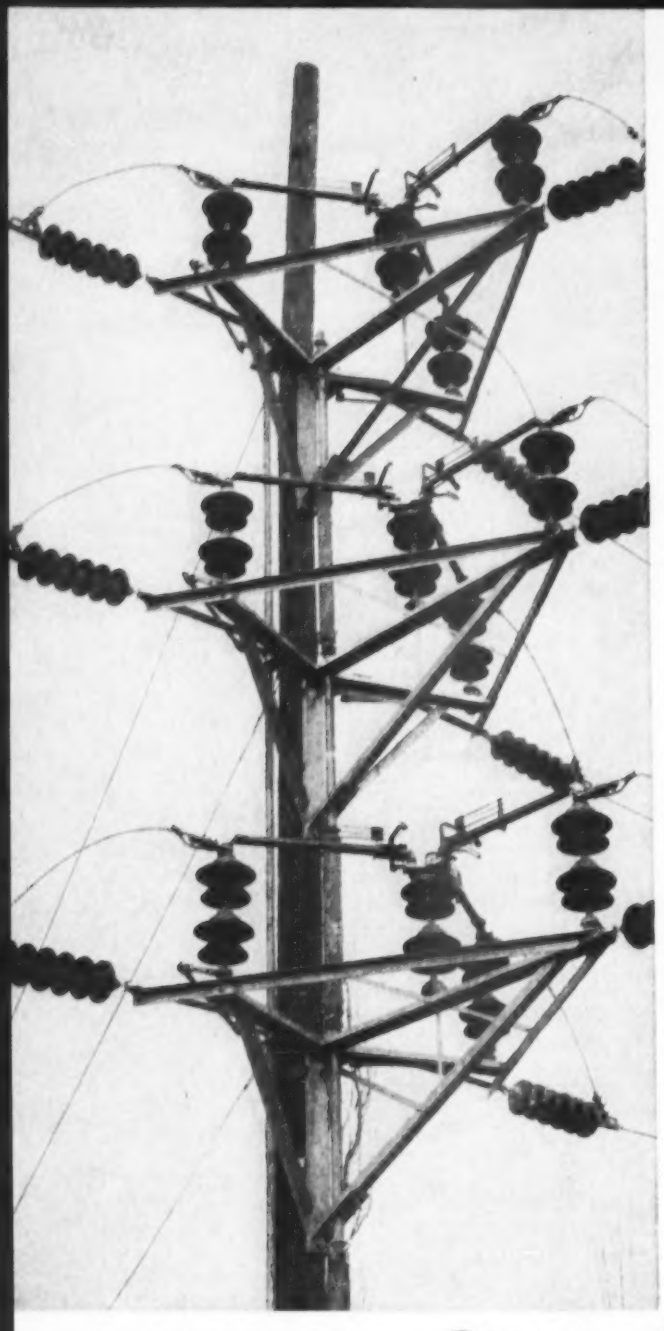
DIVISION ESSEX WIRE CORPORATION

Factory: Anaheim, California

WAREHOUSES* AND SALES OFFICES

*LOS ANGELES, 6415 East Fleet Street; *SAN FRANCISCO, 1077 Howard Street;

*PORTLAND, 525 North Tillamook Street



Save your company money and improve switching efficiency by standardizing on the

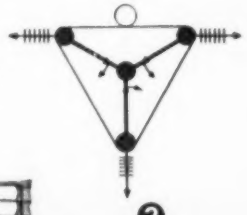
NEW CHANCE GOABS

the latest advance in "packaged" switching

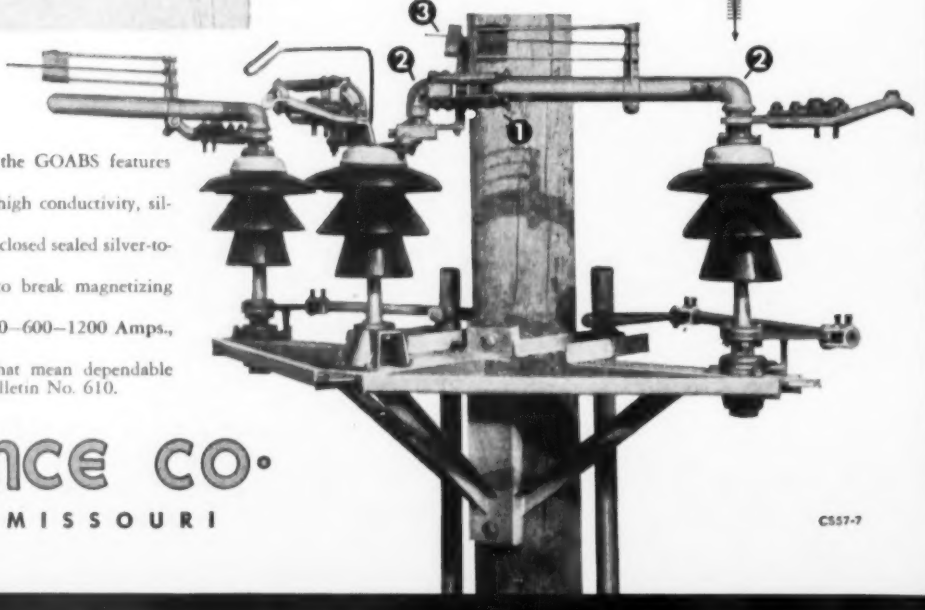
Many engineers have saved their companies as much as 25% on the cost of tap switching installations by using GOABS instead of conventional air break switches. GOABS require no more right of way than the pole line itself—only one pole is needed for either 2 or 3 way switching.

Now you can get better switching than ever before with the New type "GS" GOABS because they're built like the field proven Chance Type "S" Side Break Switches with all their finest performance features. But that isn't all—the new GOABS have fewer insulators per phase for greater savings in installation and maintenance costs... up to 30% less weight... better balance. GOABS are pre-assembled, "packaged" switches ready for mounting. This means convenience and accuracy in field installation—one piece welded frames require no bolting together. Units are balanced for easy hoisting up the pole... greaseless bearings of stainless steel require no lubrication.

Only 3 insulator stacks on 2-way switching



Only 4 insulator stacks on 3-way switching



Here is a typical 3-way installation of CHANCE Type "GS" GOABS (Group Operated Air Break Switches)

The two-way at right shows some of the GOABS features that guarantee reliable performance.

1 **High pressure contacts**—self-wiping, high conductivity, silver to copper.

2 **Braidless Construction**—completely enclosed sealed silver-to-silver hinge contacts.

3 **High-Speed Snap-Out Arcing Horns**—to break magnetizing and charging currents.

Full NEMA Rated—7.5 to 69 KV, 400—600—1200 Amps., 2-way and 3-way.

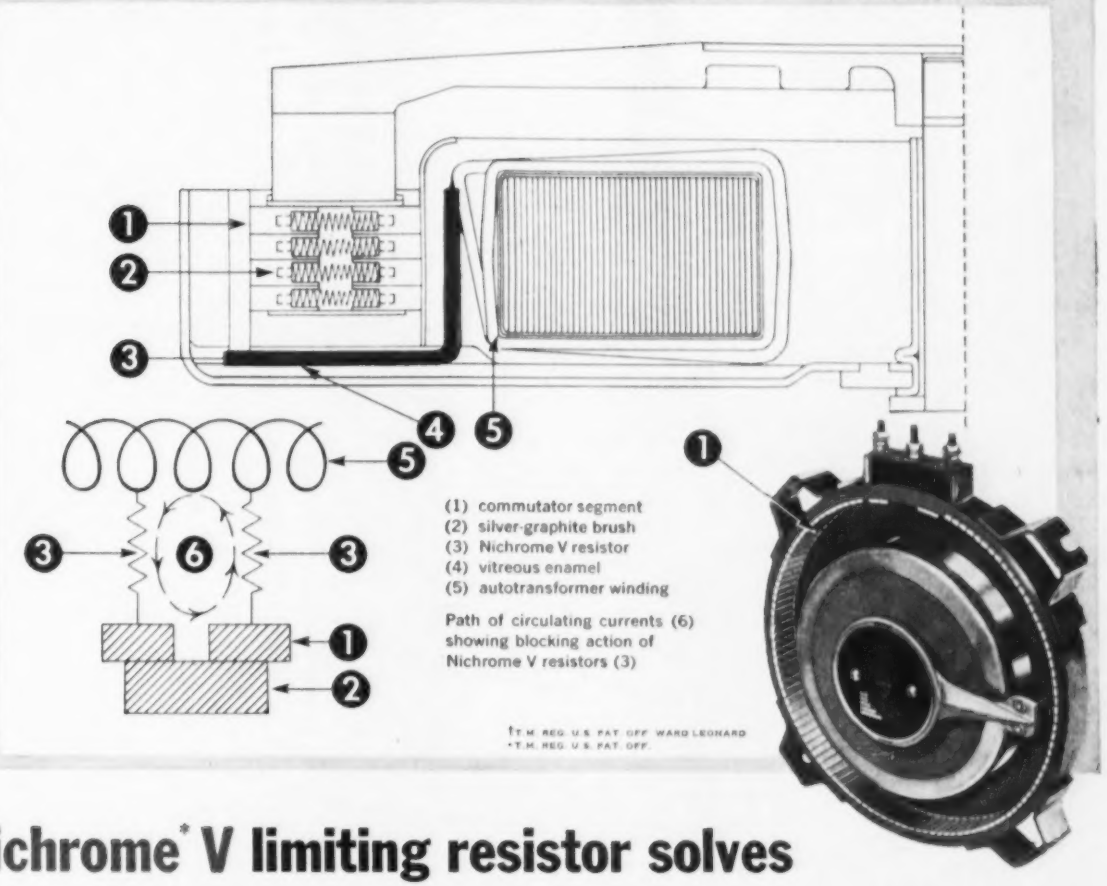
Plus many more important features that mean dependable performance—Get the full details in Bulletin No. 610.

A·B·CHANCE CO.

CENTRALIA, MISSOURI

CS57-7

DRIVER-HARRIS ALLOYS AT WORK IN PRODUCT ADVANCEMENT


(1) commutator segment
(2) silver-graphite brush
(3) Nichrome V resistor
(4) vitreous enamel
(5) autotransformer winding
Path of circulating currents (6) showing blocking action of Nichrome V resistors (3)

†T.M. REG. U.S. PAT. OFF. WARD LEONARD
*T.M. REG. U.S. PAT. OFF.

Nichrome* V limiting resistor solves age old brush problem in Ward Leonard Dimmers

This Ward Leonard 6.6 KW Radiastat† Dimmer is essentially a specially designed core type autotransformer whose output voltage is linear, furnishing smooth, stepless control from maximum to zero. Other notable features are: Highest rating in smallest size and longer, maintenance-free life.

Nearly all adjustable autotransformers depend upon carbon brushes to limit the short-circuiting current which occurs whenever the brush straddles two segments. However, in the Radiastat Dimmer, circulating currents are kept to a minimum in a unique way, permitting use of self-cleaning, self-lubricating, low resistance silver-graphite brushes.

In the Radiastat, each segment is electrically connected to its respective turn of the winding through a Nichrome V current limiting resistor. During commutation, the main winding is protected against burnout from high short-circuiting currents thereby eliminating external resistors or high resistance brushes.

These all important resistors (one for each segment) connect to the segments beneath the vitreous enamel and run out and up to connect with the winding. They protect every step of the Radiastat, regardless of the contact arm position—drop a penny or a nail across adjacent segments—there's no pouff! no burnout! The Nichrome V circulating current resistors completely safeguard the unit.

Nichrome V is used because it supplies a specified ohmage in a #10 wire 3⅜" long; bonds well with the vitreous enamel; is highly resistant to heat and corrosion, and easily withstands severe current surges.

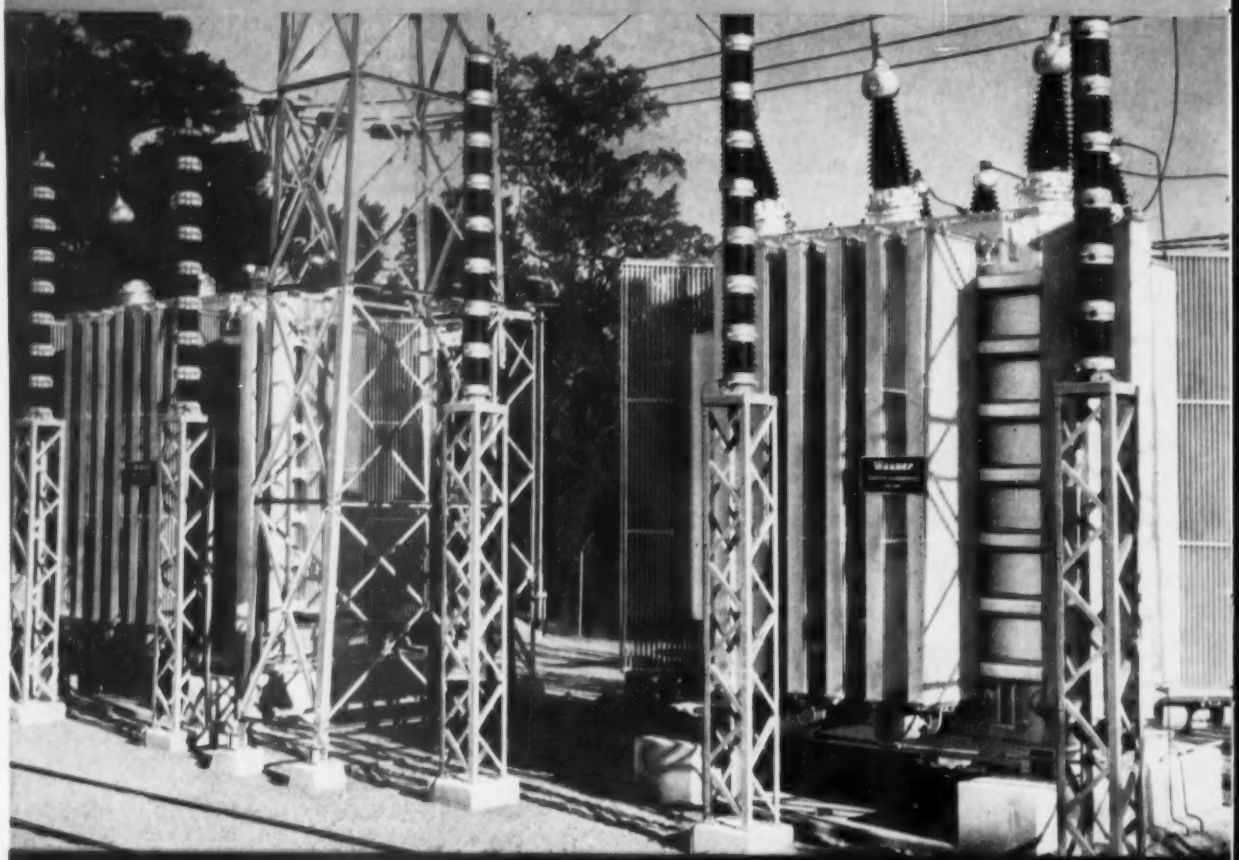
Driver-Harris now produces 132 different high nickel alloys in many different forms and in hundreds of sizes for almost every kind of industrial application. Do you need help with a special alloy? Tell us about it and if we haven't got it, we'll develop it for you.

Driver-Harris Company*

HARRISON, NEW JERSEY • BRANCHES: Chicago, Detroit, Cleveland, Louisville
Distributor: ANGUS-CAMPBELL, INC., Los Angeles, San Francisco • In Canada: The B. GREENING WIRE COMPANY, Ltd., Hamilton, Ontario

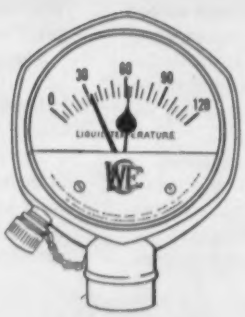
MAKERS OF THE MOST COMPLETE LINE OF ALLOYS FOR THE ELECTRICAL, ELECTRONIC, AND HEAT-TREATING INDUSTRIES

Quality is what you get
WAGNER POWER

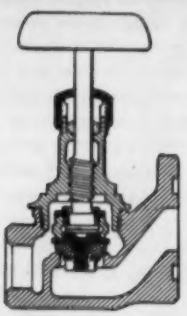


THESE SIX SMALL DETAILS ADD UP TO BETTER

DEEP, PENETRATING WELDS. Submerged electro-arc melt welds penetrate deeply, are exceptionally smooth and uniform. Inspectors say, "the best welds made anywhere."



LIQUID ACTUATED THERMOMETERS. Much more accurate and dependable than thermometers that are actuated by a coiled bi-metal strip.



DRAIN VALVES THAT DRAIN *ALL* THE OIL. This 2" bolted-on drain valve, with auxiliary oil sampling valve, will drain the tank completely. Used on ASA standard rated transformers.

when you specify TRANSFORMERS

The extreme care given each Wagner Power Transformer—from inception to installation—is in keeping with Wagner's one objective . . . to build the best possible transformer that will give you years of completely dependable service.

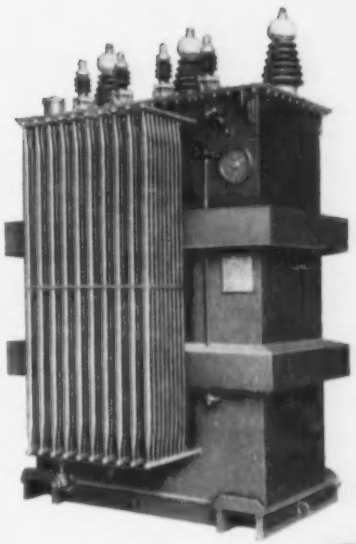
Here are a few of the big reasons why you gain when you specify Wagner:

POWER TRANSFORMER WINDINGS, in general, are disk type for the high voltage windings and helical type for the low voltage windings—best suited to obtain rigid bracing and provide low temperature gradients throughout.

LEADS AND TAP CONNECTIONS are effectively supported for safe electrical clearance and mechanical rigidity by means of firmly positioned bakelite tubes or strong clamps on the supporting members.

TANKS are designed for strength to withstand operating pressures, with braces of heavy fabricated structural steel on the sides and ends spaced to eliminate low frequency audio noises. All seam welds are made by a fully automatic welder.

Get the whole story . . . write for Bulletin TU-16D or better yet, ask your nearby Wagner branch to show you Wagner's sound-color movie: "Transformers in the Making."



LIVE BETTER ELECTRICALLY

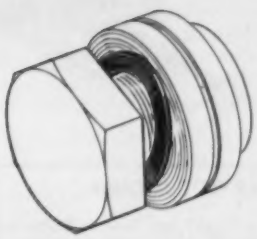
Wagner Electric Corporation

6381 PLYMOUTH AVENUE, ST. LOUIS 14, MISSOURI

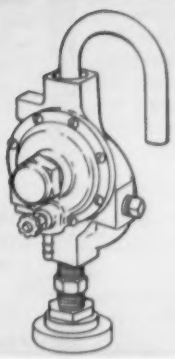
BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

T57-15

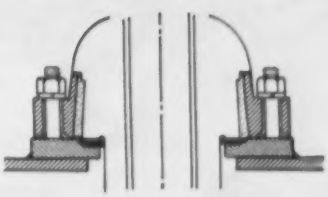
PERFORMANCE – EASIER MAINTENANCE



LEAK-PROOF MOUNTING BOSS. For thermometer wells, relay wells and radiator drain plugs. Serrated surfaces make annular grooves in the annealed copper gasket to form leak-proof joint.



VACUUM-PRESSURE BLEEDER VALVE. Has large diameter diaphragms to actuate the valve mechanism when pressure or vacuum inside tank becomes too great. Located on the outside of sealed units for your convenience.

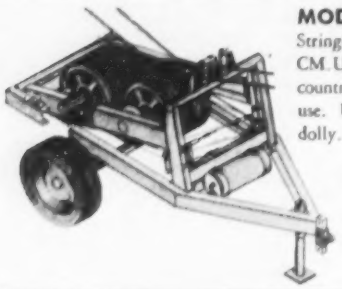


LEAK-PROOF BUSHING JOINT. The gasket is compressed between the porcelain shoulder of the bushing and the tank mounting flange—easy to tighten, simple to replace. Used on transformers with voltages 15 KV and below.

Partial showing of the now ***COMPLETE*** line of...

PENGO TENSION WIRE STRINGING EQUIPMENT

Manufactured by PETERSEN ENGINEERING CO., Santa Clara, Calif. • 14 Patents Pending!

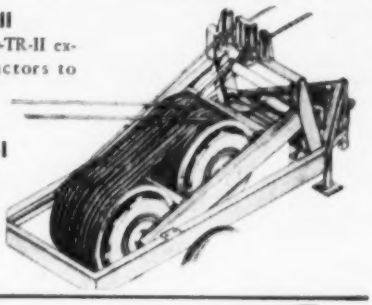


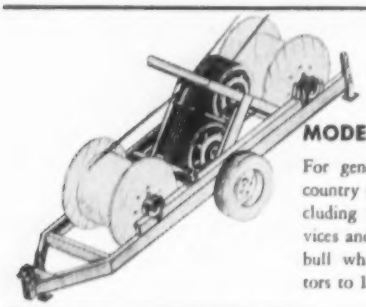
MODEL 5000-TR-II
Strings two conductors to 556,300 CM. Used primarily for very rough country work; also for general use. Use separate reel-carrying dolly.

MODEL 5000-TR-I
Similar except strings one conductor.

MODEL 6000-TR-II
Similar to Model 5000-TR-II except larger. Conductors to 1,272,000 CM.

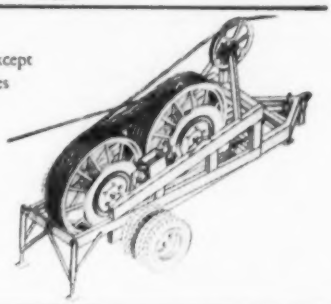
MODEL 6000-TR-I
Similar except for one conductor.

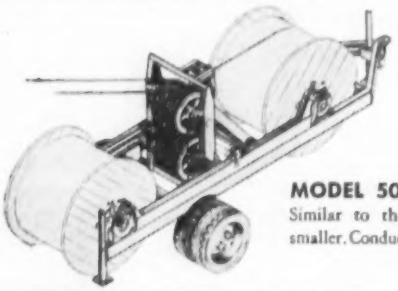




MODEL 6000-WS-TR
For general and medium rough country use. A complete unit including trailer, reel-carrying devices and its own double pair of bull wheels. Conductors to 1,272,000 CM.

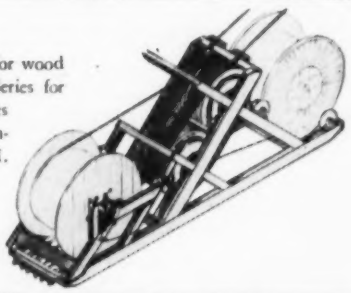
MODEL 7000-TR-I
Similar to model 6000-TR-I except larger. Conductors to 2 inches diameter.

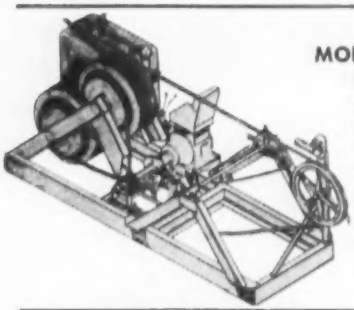




MODEL 5000-WS-TR
Similar to the 6000-WS-TR but smaller. Conductors to 556,300 CM.

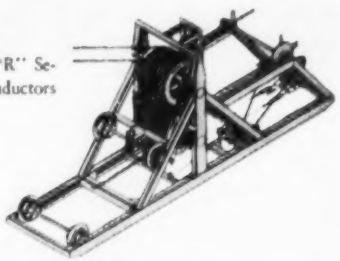
MODEL 6000-W
Available in "S" Series for wood or steel reels, in "R" Series for steel reels, or "SR" Series for trailer mounting. Conductors to 1,272,000 CM.

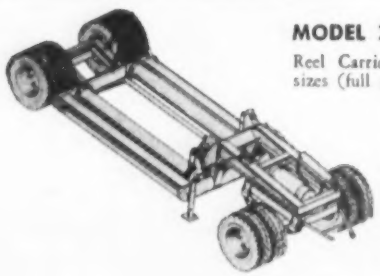




MODEL 6500
Bull Wheel Cable Puller. Available in "R" Series for steel reels, "S" Series for wood reels. Conductors to 1,272,000 CM. Also available in "LWR" Model for extra-large steel reels. Model 5500 similar (smaller).

MODEL 5000-SR
Available in "S" Series, "R" Series, or "SR" Series. Conductors to 556,300 CM.





MODEL 7500
Reel Carrier. Takes the largest sizes (full range) of steel reels. Loads and unloads with one man. No auxiliary equipment needed except the truck that pulls it. For use with any one of the tensioning machines shown on this page.

ADDITIONAL MODELS NOT SHOWN

Tension Reel Trailers

MODELS 2, 3, and 4, Two-Wheel Straddle Dollies not shown. For use with any one of the tensioning machines shown on these pages.

Tension Stringers

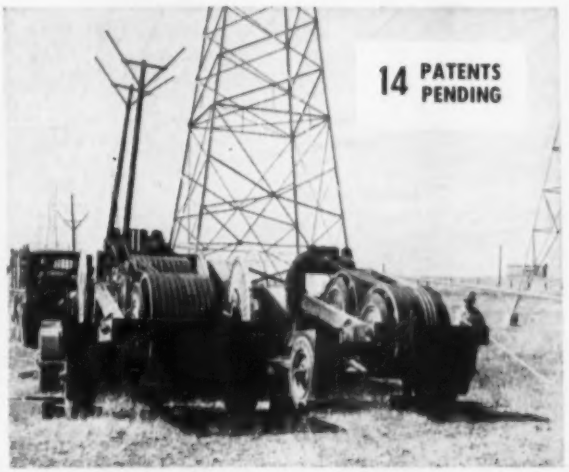
MODELS 6000-SK-I and 6000-SK-II For one or two conductors to 1,272,000 CM. Skid mounted for installation on owner's equipment.

MODELS 5000-SK-I and 5000-SK-II Skid mounted for installing on owner's equipment. For stringing one or two conductors to 556,300 CM.

MODEL 5000-WS-III Strings three conductors to 556,300 CM. For mounting on low-bed or full trailer.

MODEL 6000-WS-III Strings three conductors to 1,272,000 CM. For mounting on low-bed or full trailer.

It takes **KEARNEY QUALITY**



Two PENGO model 6000 TR-11 wire tensioners being used by Pacific Gas and Electric Co. in reconductoring job between Vacaville, Calif. and Cottonwood, Calif. 285 miles of 500 MCM copper is being replaced by 954 MCM aluminum in this operation.

Newest method of stringing overhead lines

Two PENGO model 6500 Bullwheel Cable Pullers used by Pacific Gas and Electric Co. for pulling in the new line on the job mentioned above. Unit, manned by an operator and one reel tender, pulls the pulling line (in this instance the old copper conductor) over the double neoprene lined Bullwheels and winds it for shipment in a single operation.

- **Safest, most economical way of stringing transmission, distribution and even secondary lines.**
- **Its greatest savings are effected when stringing over and through energized circuits . . . by far the safest, too!**
- **14 Patents pending!**

Smooth, postive control of conductor tension can be maintained at all times regardless of model or size of PENGO tensioning equipment used. The large, specially designed PENGO disc brakes are mounted away from the Bullwheels to assure dissipation of the heat generated by the continuous braking action and prevent transmission of the heat to the Bullwheels.

Note the wide range of models on the opposite page available for all types of jobs or terrain and for all sizes of conductor.

List your requirements and send for descriptive literature and prices.

Made by the makers of the World-Famous
PENGO EARTH AUGERS

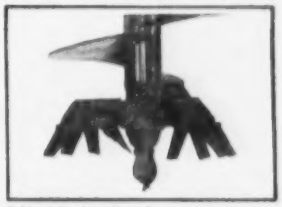
PETERSEN
ENGINEERING COMPANY
Santa Clara, Calif.

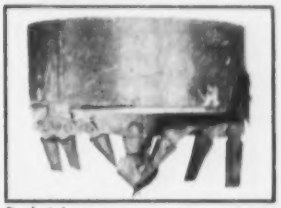
PETERSEN ENGINEERING CO.
Santa Clara, California Dept. 3
Please send me more information on the new Pengo wire stringing equipment.
Name_____
Firm_____
Address_____
City_____ State_____

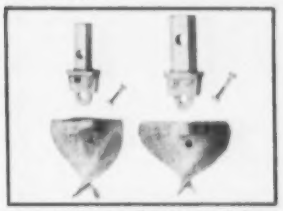
Other PENGO Products include:

24 inch Heavy Duty Flight Auger

Double-Helix Heavy Duty Auger


Offset Boring Head


Bucket Auger


Screw Bit for Small Diameter Holes

Pulling Eye

Pole and Transformer Chariot

It takes **KEARNEY QUALITY** in fuse links to give you positive protection... close coordination

FUSE LINKS FIELD-TESTED

Here at KEARNEY's Substation Laboratory of 150,000 KVA Transformer capacity—with a back up power of 445,000 KVA—all equipment is tested under rigorous field conditions. KEARNEY Certified Ratings are not theoretical calculations... but actual, proved performance ratings.

controlled manufacture, rigorous testing provide maximum service continuity

Quality control in KEARNEY Fuse Links starts with design... and continues through careful selection of materials, precision parts manufacture, expert assembly and strictest inspection and testing. The end result is dependable protection... *uniformity* that guarantees all Fuse Links of the same rating will perform exactly alike.

ALL KEARNEY Fuse Links feature low temperature operation. Pure tin elements or low melting point solder, selected for proper strength and melting temperature for each current rating, keep temperatures inside the cutout tube well below charring point. This provides accurate, positive arc clearance even after long periods of overload.

Take care of your requirements in Specialized and Standard Fuse Links with KEARNEY... best you can buy! Contact your KEARNEY Representative.

JAMES R. KEARNEY CORPORATION
General Offices: 4236 Clayton Ave., St. Louis 10, Mo.

IN THE WEST: for prompt service, contact Kearney's West Coast Distributor, **Maydwell and Hartzell, Inc.,** Los Angeles • Seattle • Portland • San Francisco • Spokane • Phoenix.

379W

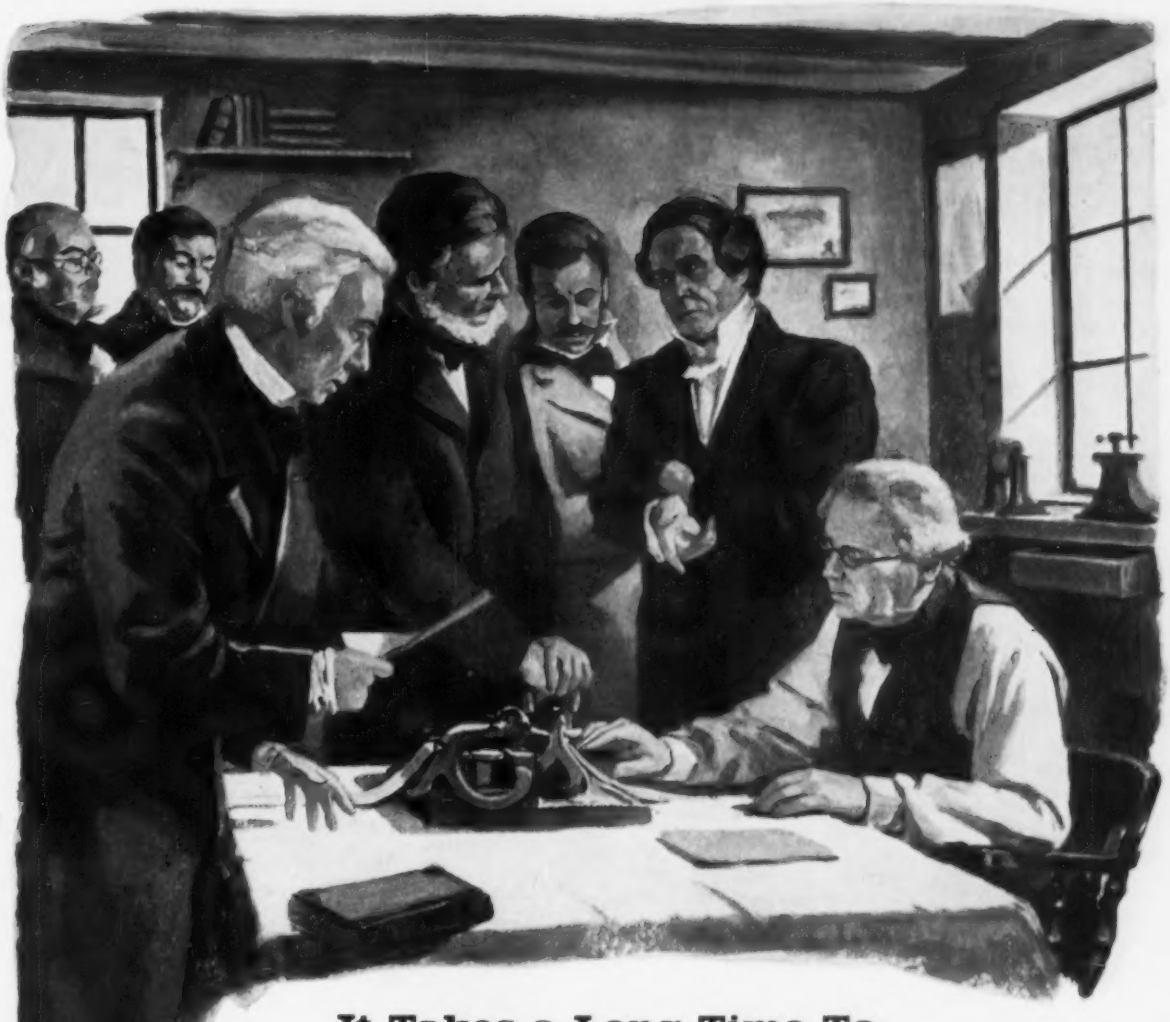
for BETTER CONSTRUCTION
SAFER MAINTENANCE
Specify

JAMES R. KEARNEY

KEARNEY PRODUCTS

The Mark of Quality

Plants at: ST. LOUIS • FAYETTEVILLE, ARKANSAS • SHENANDOAH & CLARINDA, IOWA — GUELPH, ONTARIO, CANADA



It Takes a Long Time To Bring Excellence To Maturity*

*Publilius Syrus 42 B. C.

Samuel Finley Breese Morse:

Morse was a remarkable prophet. In 1868 he wrote, "In commending Kerite especially for telegraphic purposes I would by no means leave out of view its other various applications in the arts no less extensive and useful."

Some 70 years later, Kerite was chosen for a most singular art—the production of the first special cables for the Manhattan Project, Oak Ridge, Tennessee. The Kerite Company was *the only organization* entrusted to design and manufacture 15 entirely new types of cable to help speed the production of the world's first atomic bombs. Never before had flexible cables (more than a million feet) been used on such unusual voltages. The inherited skill and integrity of more than three generations of dedicated Kerite men insures the highest standards of manufacture of all Kerite cable—standards upon which American industry depends.

The value and service life of a product can be no greater than the integrity and craftsmanship of its maker.

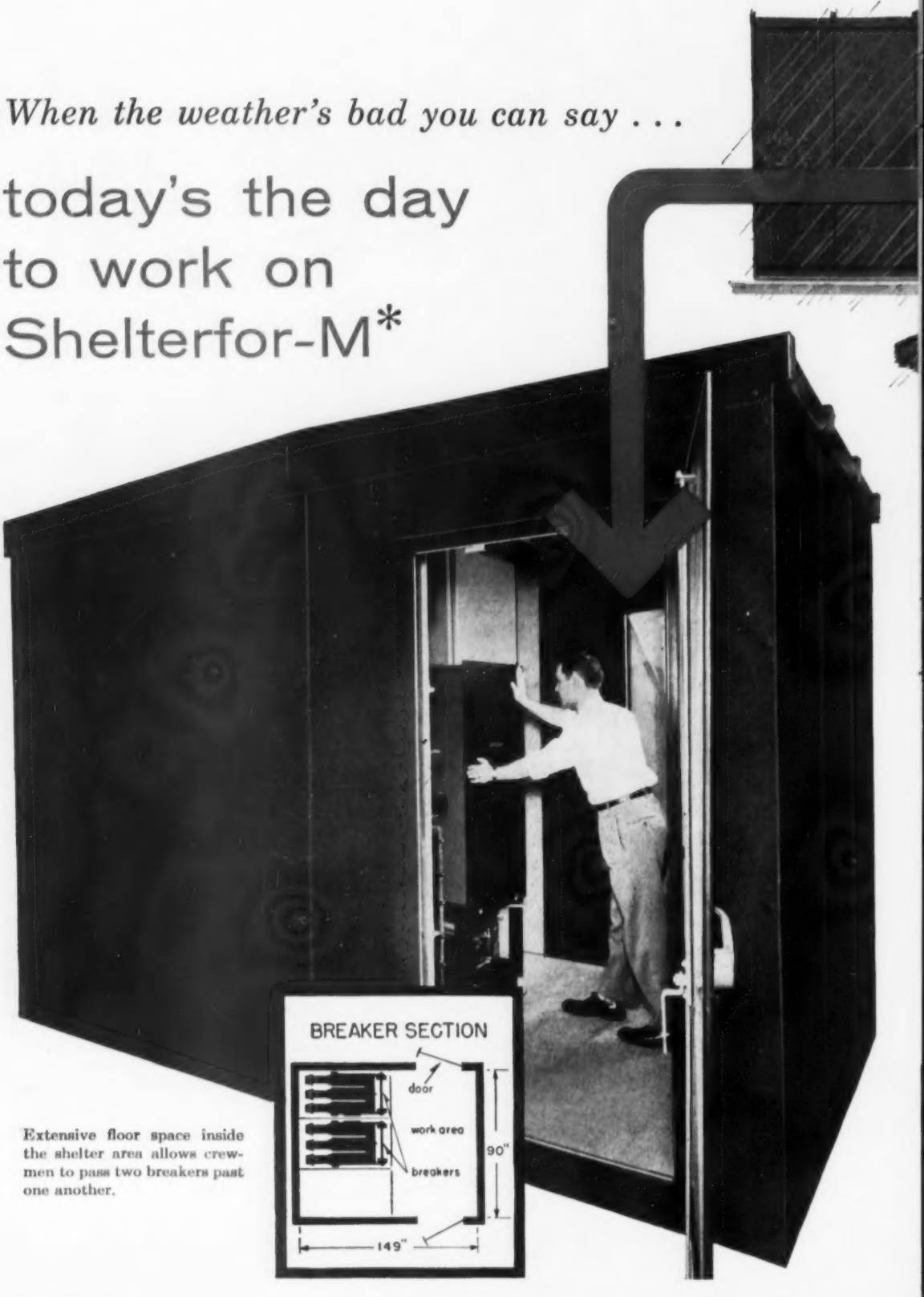
Founded 1854

KERITE CABLE

THE KERITE COMPANY—30 Church St., New York 7, N. Y.
Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston;
4101 San Jacinto, Houston 4, Texas; 1010 Euclid Avenue, Cleveland 17, Ohio;
29 West Lancaster Avenue, Ardmore, Pa.

When the weather's bad you can say . . .

today's the day to work on Shelterfor-M*



Extensive floor space inside the shelter area allows crewmen to pass two breakers past one another.

Cold, rain, snow or sleet . . . your crews can work *inside* on *outdoor* switchgear when you have Westinghouse Shelterfor-M. No longer is it necessary to hang canvas tarps and build make-shift shelters to work on breakers, instruments or relays when the weather is bad. In fact, maintenance men *use* the wet weather to work in the new Westinghouse metalclad switchgear . . . and save the pleasant days for the regular exposed-to-weather installations.

Roomy interior of the Shelterfor-M switchgear allows instrument panels to swing wide for front drawout of breakers for inspection and testing. Two breakers can be passed, side-by-side, even with the doors open wide, inside the covered passage-way.

You also get the many outstanding features of standard Westinghouse switchgear: undercoating, multicoat painting and Bonderized finishing, to eliminate rust and corrosion. Exclusive Redarta® flame retardant insulation. Jig-welding construction for interchangeability of like-rated breakers.

For complete information call your local Westinghouse sales engineer or write to Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-60924

*Shelterfor-M . . . shelter for maintenance

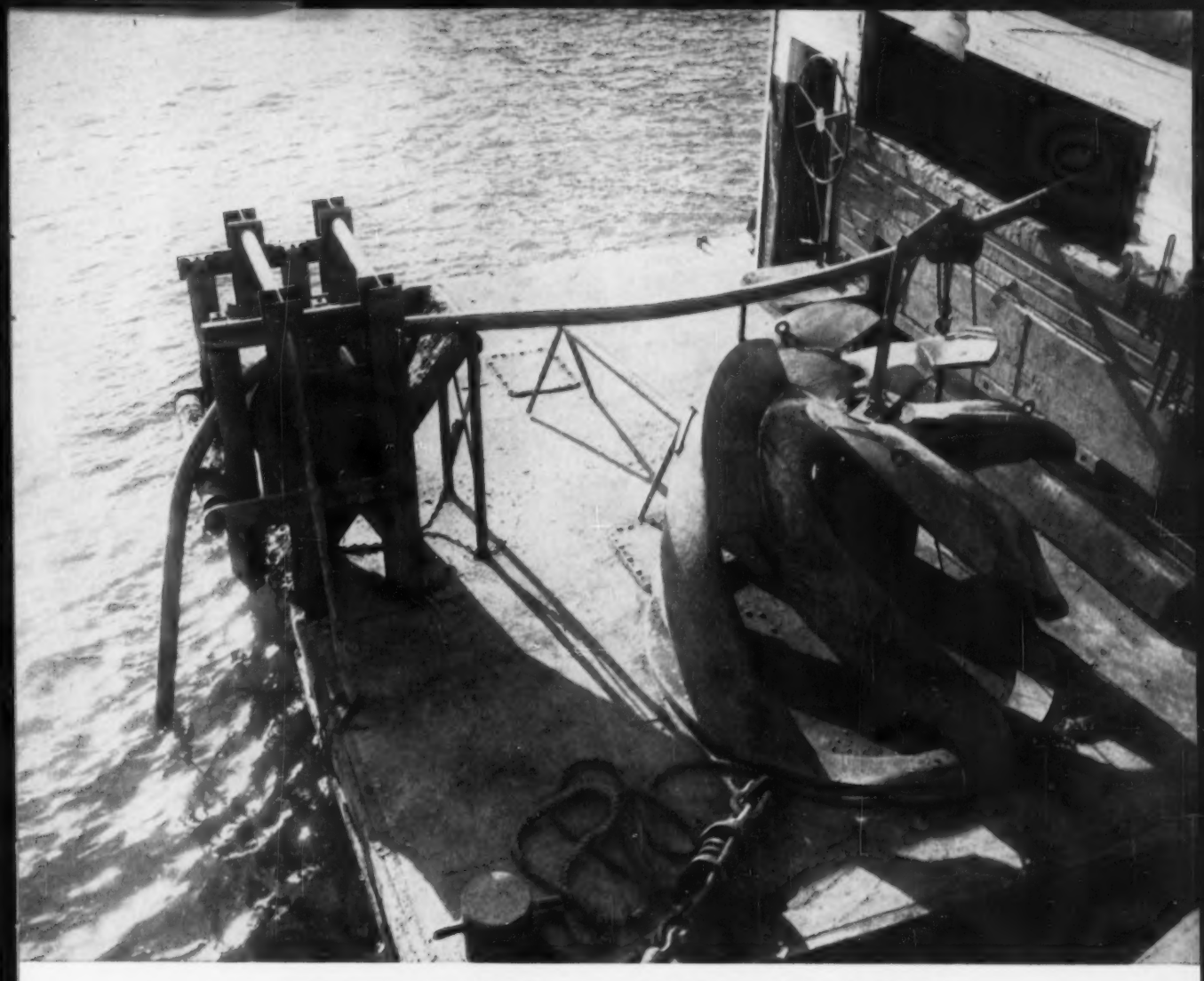
YOU CAN BE SURE...IF IT'S Westinghouse

Oil beats Sludge to the punch

DO MAINTENANCE CHECKS show equipment deterioration resulting from sludge build-up or acid formation? Then now is the time to switch to SHELL DIALA OIL AX—the insulating oil which *fights oxidation*, main cause of sludge and acid.

The secret of Diala's knockout power is a specially-developed oxidation-inhibitor, which is incorporated in an oil *specifically* refined for inhibiting. This combination is so effective, users report Shell Diala AX is still sludge-free *years after ordinary oils fail*. As a result, you get from three to five times the usual service life on your electrical equipment when you use this Shell insulating oil. *Plus* the advantage of eliminating the need for costly maintenance and frequent oil purification.

Chances are Shell Diala Oil AX—first of the inhibited oils—is the answer to your problem. It is one of many fine products developed by Shell Research, a 1500-man team strong on experience in your industry. Why not put that experience to work this week?



Built for a long life of hard knocks, this 4,500-foot, 3-phase, 20kv, shielded Okolite insulated cable with Okoprene sheath powers the rotary cutter head at right. Although nearly 5 inches thick, this cable has all the flexibility needed for dredging operations.

the previous OKONITE cable lasted 15 years

...but this one is built for even better service

Pacific Dredging Company has recently put into service an Okonite replacement for an Okonite 15kv armored cable that had seen fifteen years of successful service . . . two to three times normal expectancy. In the strenuous operation of cables feeding power to giant dredges from shore stations, five years' service life is considered good.

But the new cable was designed to last even longer than its predecessor. The major cause of breakdown in dredging cables has been deterioration of the armor wire, which breaks and punctures the insulation. To overcome this, Okonite engineers replaced the armor with a tough, mold-cured, reinforced Okoprene sheath. Although this construction has only been in operation for a year, Pacific Dredging Company is confident that it will outperform the old one.

This example of Okonite's constant determination to "better the best" shows why Okonite has always been considered a leader in developing and building the finest cables available. Do you have a cable problem? There's a good chance that Okonite engineers have already solved it. Find out today. The Okonite Co., Passaic, N.J.

4349

where there's electrical power . . . there's **OKONITE CABLE**

GOING

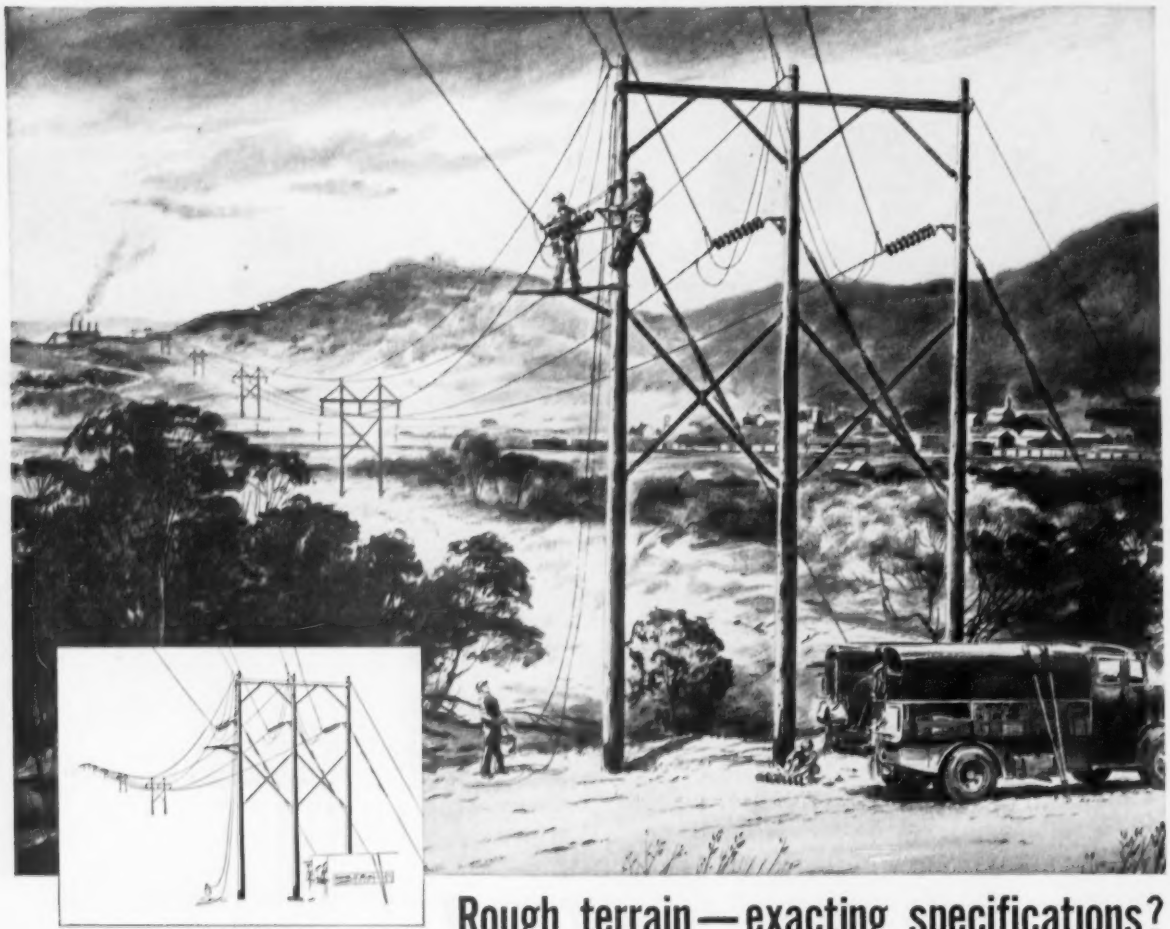
UP

This Year More POLE STARS Are Being Installed Than in Any Previous Year

Steadily increasing sales of *any* product—month after month, year after year—must be based on a growing respect for that product. In the case of Pole Star Distribution Transformers, the tremendous growth in nationwide acceptance can be attributed to Pole Stars' reputation for economical, *sustained* performance in every type of distribution transformer installation.

The reason is *sound design*—built around Pennsylvania's patented lap-on-top core—plus precisely controlled production that results in "peas-in-a-pod" construction and quality in every Pole Star made. Pole Stars are available in all standard single-phase sizes from 3 through 500 kva, through 67,000 volts. Pennsylvania Transformer Division, McGraw-Edison Company, Canonsburg, Pa.

PENNSYLVANIA DISTRIBUTION TRANSFORMERS



You can get prompt help with any outside construction problem through your Graybar office. In over 130 cities there are Graybar offices and warehouses ready to fill your every need for line materials, hardware and tools. And through any of these offices you can get the help of Graybar Outside Construction Specialists, strategically located in 19 principal cities, equipped by training and experience to give you prompt, dependable help.

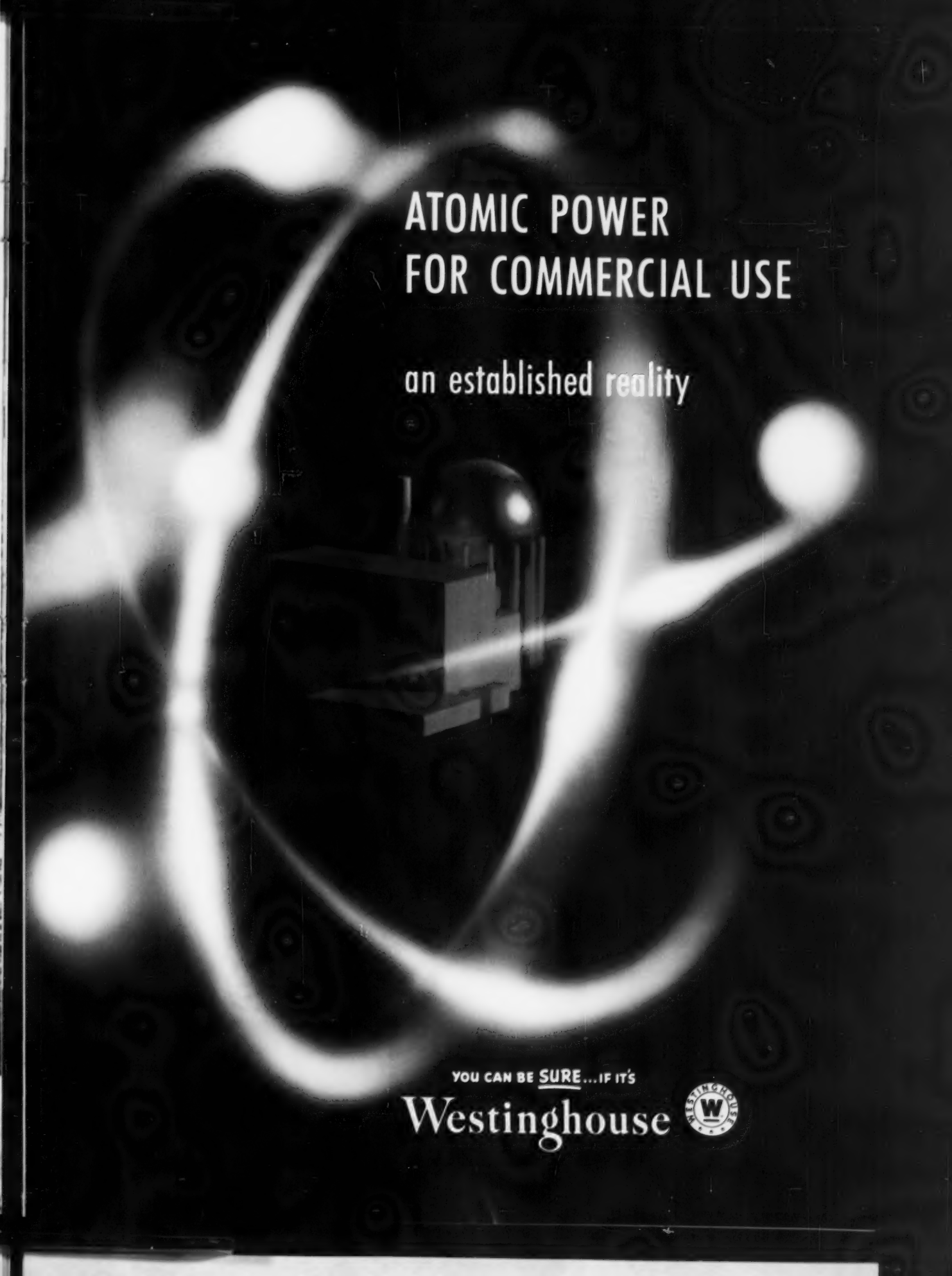
Rough terrain—exacting specifications?

Call on Graybar for everything you need

Line building can challenge the skill and ingenuity of the best transmission engineers. When the line runs through rugged country, when the specifications are precise, take full advantage of the broad facilities and specialized experience of Graybar. No matter where your job site may be located, no matter what new requirements may be presented in tensions, insulation and erection, call on Graybar for engineering assistance as well as all your transmission line materials and supplies. If you would like to see our bulletin on High Voltage Transmission Line Materials, and you are located in the U. S. or its possessions, write us for your copy. It's complete with illustrations, applications and specifications. It is free, of course. 710-88

CALL **GraybaR** FIRST FOR

GRAYBAR ELECTRIC COMPANY, INC., 420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK, IN OVER 130 PRINCIPAL CITIES


ATOMIC POWER
FOR COMMERCIAL USE
an established reality
YOU CAN BE SURE... IF IT'S
Westinghouse
WESTINGHOUSE

This is YANKEE . . .

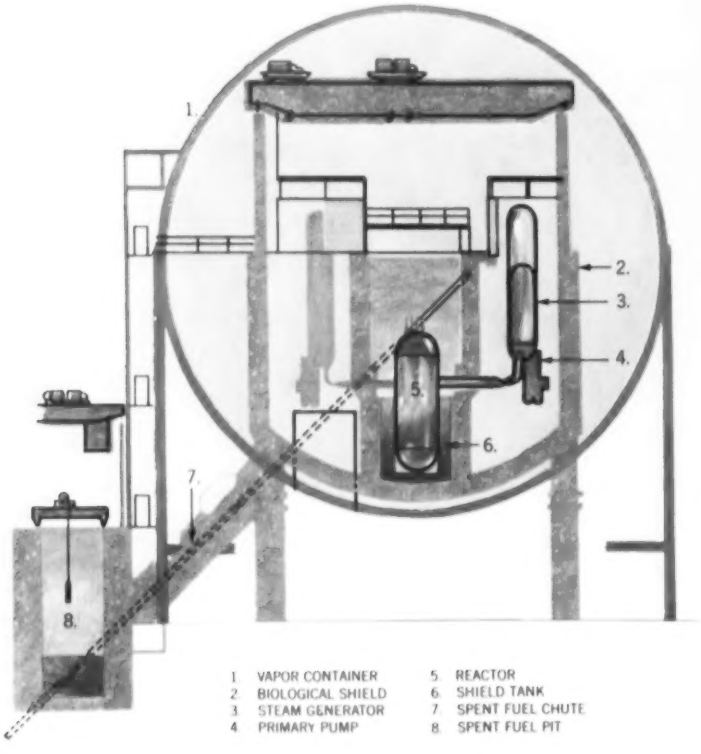
134,000 KW Power Generating Station for New England

Yankee Atomic Electric Company is building a 134,000 kilowatt atomic power plant in western Massachusetts near the town of Rowe. The overall design, engineering and construction of this plant is being handled jointly by Westinghouse Electric Corporation and Stone & Webster Engineering Corporation. Yankee's pioneering plant is being sponsored by ten of New England's leading utilities.

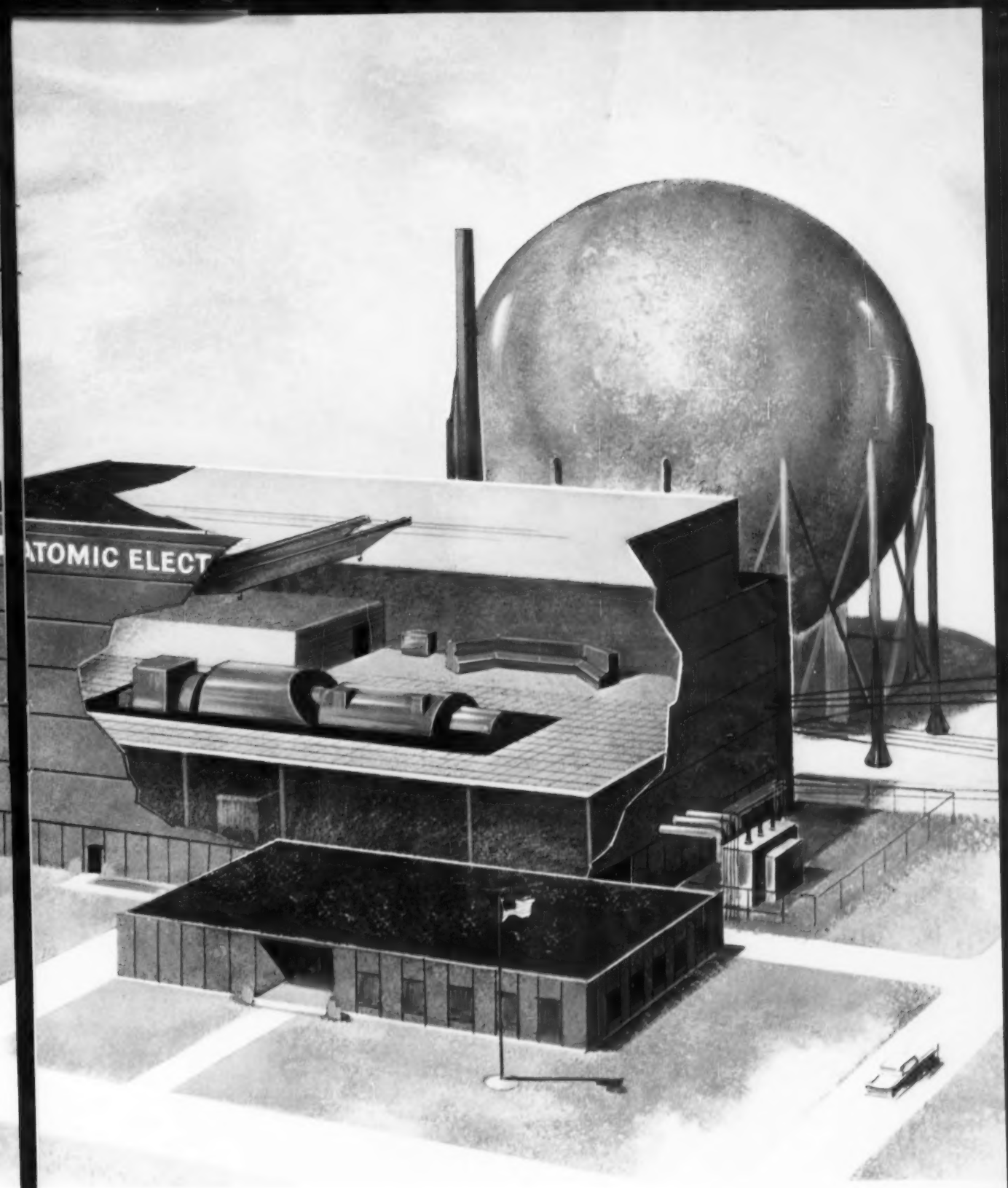
This first atomic power plant in New England will be similar to a standard steam-electric station except for the "boiler" equipment. An advanced, pressurized water, atomic reactor (using uranium as fuel) with its controls, auxiliaries and heat exchangers, will replace the conventional coal or oil-fired boiler.

The research and development program for this project is being financed jointly by the Yankee Atomic Electric Company and the Atomic Energy Commission. The AEC, through its Power Demonstration Reactor Program has agreed to underwrite up to $5,000,000 of this research and development cost. This research will benefit any company which later uses a reactor of this same general type. Yankee Atomic Electric Company has contracted with Westinghouse to carry out the research and design for its atomic reactor.

The Yankee plant is scheduled for initial operation in 1960.



1. VAPOR CONTAINER
2. BIOLOGICAL SHIELD
3. STEAM GENERATOR
4. PRIMARY PUMP
5. REACTOR
6. SHIELD TANK
7. SPENT FUEL CHUTE
8. SPENT FUEL PIT



YOU CAN BE SURE... IF IT'S Westinghouse

This group includes: APD's Technical Director; an advanced development consultant; a staff consultant on core engineering; a specialist on fuel element design and core fabrication; a technical liaison engineer.

In the atomic power market

these men are today's best buy

Westinghouse has been a leader in research and in the development of power apparatus for over 70 years. It was to maintain this leadership that the company entered the nuclear field over 18 years ago.

The Atomic Power Department (APD) is responsible for the design, development, application and sale of nuclear steam generators for the generation of electric power and industrial steam and for merchant marine propulsion. APD is also charged with the coordination of applications which involve the complete apparatus which Westinghouse manufactures for atomic power plants.

Among the additional projects at Westinghouse Atomic Power Department are: the first large aqueous homogeneous reactor (in partnership with Pennsylvania Power and Light Company); the Belgian Thermal Reactor, the first atomic power generating plant sold in the international market.

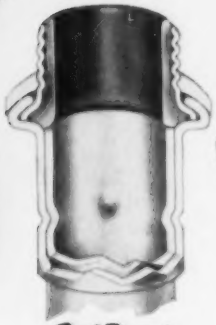
Westinghouse is ready — from planning to engineering to production of everything from reactor core to customer's meter. For complete information or assistance, contact your Westinghouse Sales Engineer, or write: Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania. AP-4500

YOU CAN BE SURE... IF IT'S Westinghouse

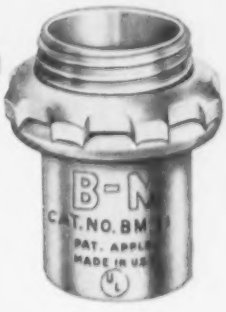
B-M

the original concrete-tight **INDENTER FITTINGS** *for E.M.T.*

Red Throat Insulated Connector



Red Throat Cross section



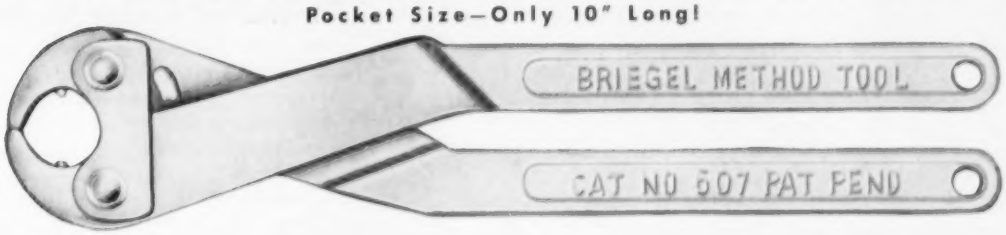
"BM" #100 Cutter for ½, ¾ and 1" E.M.T.

"BM" #1000 Holder for ½, ¾ and 1" E.M.T.

"BM" #600 Changeable Jaw Indenter

THE NEW BM607 INDENTER FOR ½" FITTINGS

Pocket Size—Only 10" Long!



FREE 30 DAY TRIAL OF THE NEW BM-607 ½" INDENTER

Your BRIEGEL Distributor has been authorized to give you a 30 DAY FREE TRIAL of the New BM-607 Indenter for ½" fittings.

This Smaller Lightweight Tool requires only half the hand pressure formerly needed to make neat deep positive grounded impressions.

Ease of action is made possible by an exclusive new Floating-Fulcrum principle that greatly increases leverage.

Try the New BM-607 Indenter Free for 30 Days. See for yourself how much lighter it is to carry—how much easier it is to use!

THIS FREE TRIAL OFFER IS LIMITED TO 30 DAYS

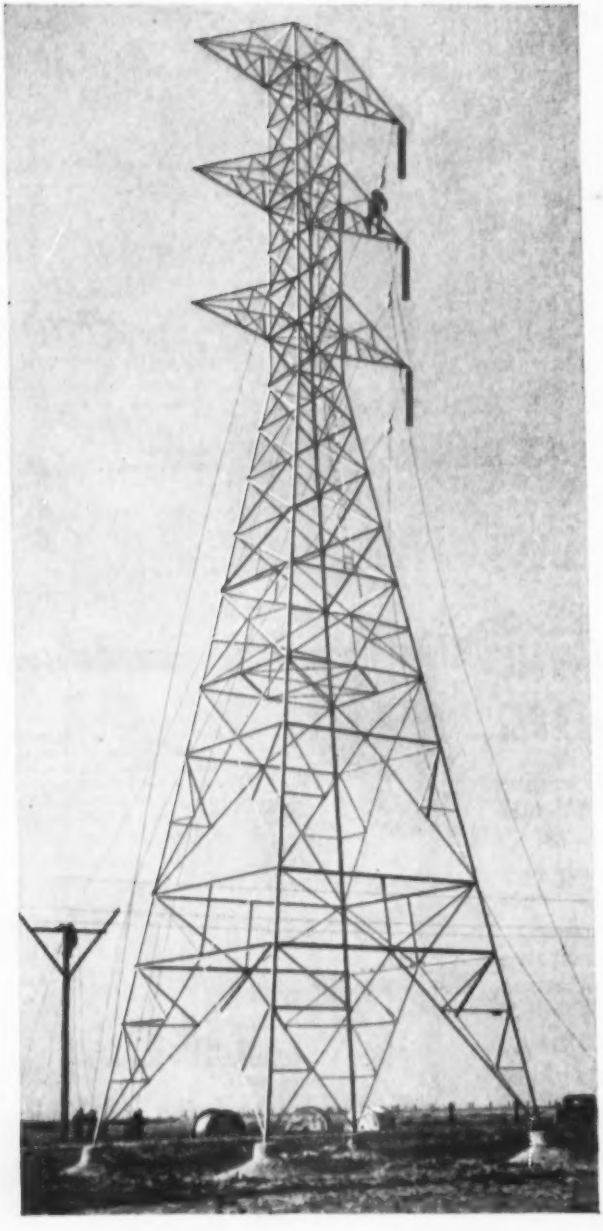
All B-M Indenter Fittings are U.L. Approved as concrete-tight and all Compression Fittings as rain-tight as well as for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

BRIEGEL METHOD TOOL CO.

GALVA, • ILLINOIS

SOLD ONLY THROUGH ELECTRICAL WHOLESALERS

All-Aluminum Conductors ADD CAPACITY,



Stringing Reynolds All-Aluminum Conductor on a PG&E tower. This tower can support lines carrying more capacity when the conductor is lightweight all-aluminum.

All-aluminum conductors are not new to Pacific Gas and Electric, with some 3,000 circuit miles of these cost-cutting conductors in service. Most of PG&E's all-aluminum line is in light loading areas, on 60, 70, 110 and most recently, on 220 kv systems. On one section of a recent San Joaquin Valley installation, PG&E used 1,113,000 CM Reynolds All-Aluminum Conductor for 220 kv transmission—*one of the largest conductors for the highest voltage in the PG&E system.*

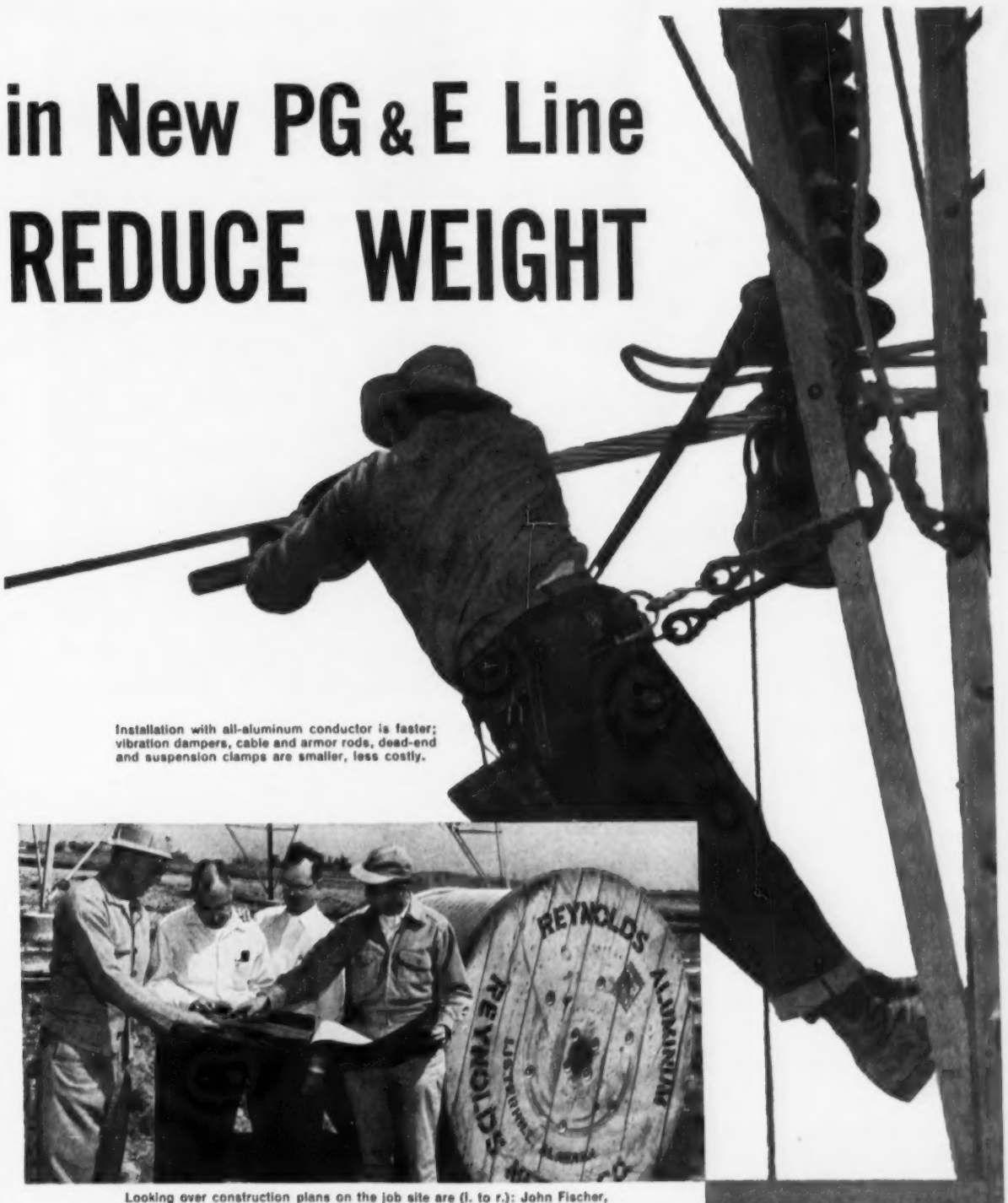
How you can save with Reynolds All-Aluminum Conductor

Tough, lightweight Reynolds All-Aluminum Conductor for use in light loading areas is not only economical but also saves in labor, fittings and installation. Towers reflect savings because they are designed for less stress than with heavier conductors. Cable and armor rods, dead-end and suspension clamps, vibration dampers are all smaller and cost less. And, of course, the lighter all-aluminum conductor costs less to ship and handle.

Reynolds Engineering Service Helps

Reynolds Engineering Service—available to you in your office and in the field—is an important plus in helping you get maximum benefit from the Aluminum you use. For full details on Reynolds All-Aluminum Conductor, ACSR, Covered Conductor and other products for the electrical industry, contact your nearest Reynolds Electrical Distributor, Reynolds Branch Office or write *Reynolds Metals Company, P.O. Box 1800-EK, Louisville 1, Kentucky.*

in New PG & E Line REDUCE WEIGHT



Installation with all-aluminum conductor is faster; vibration dampers, cable and armor rods, dead-end and suspension clamps are smaller, less costly.

Looking over construction plans on the job site are (l. to r.): John Fischer, PG&E General Foreman; Art Coburn, Reynolds Engineer; Harold Adams, Reynolds Electrical Conductor Supervisor and Elwyn G. Lambert, PG&E Supervising Electrical Engineer.

REYNOLDS ALUMINUM

See "CIRCUS BOY", Sundays, NBC-TV. Watch for Reynolds on "Disneyland", ABC-TV.

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

The Ballast That Thinks!

ADVAN guard

ADDS YEARS TO BALLAST LIFE

BEGINS A NEW ERA IN FLUORESCENT LIGHTING...

105°C	10—12 YEARS
115°C	5—6 YEARS
125°C	2½—3 YEARS
135°C	1¼—1½ YEARS

Full ballast life depends on maintaining normal internal operating temperature of 105°C. For each 10° C. increase in temperature ballast life will be cut in half. ADVAN-guard prevents abnormal operating temperatures and assures full rated ballast life.

Years of diligent research and testing have resulted in the development of ADVAN-guard . . . the first major development in fluorescent lamp ballast design since the introduction of the fluorescent lamp.

ADVAN-guard . . . a thermally actuated automatic reclosing protective device, adds years to ballast life by preventing ballast operation at abnormal temperatures. ADVAN-guard is sensitive to voltage and current as well as temperature and protects against excessive voltage supply . . . internal ballast short circuiting . . . inadequate lamp maintenance . . . improper fixture application and eliminates the need for individual fixture fusing.

To assure maximum protection for fluorescent lighting installations, provide ADVAN-guard Fluorescent Lamp Ballasts. Write for detailed literature.

ADVAN-guard is listed by Underwriters Laboratories, Inc.

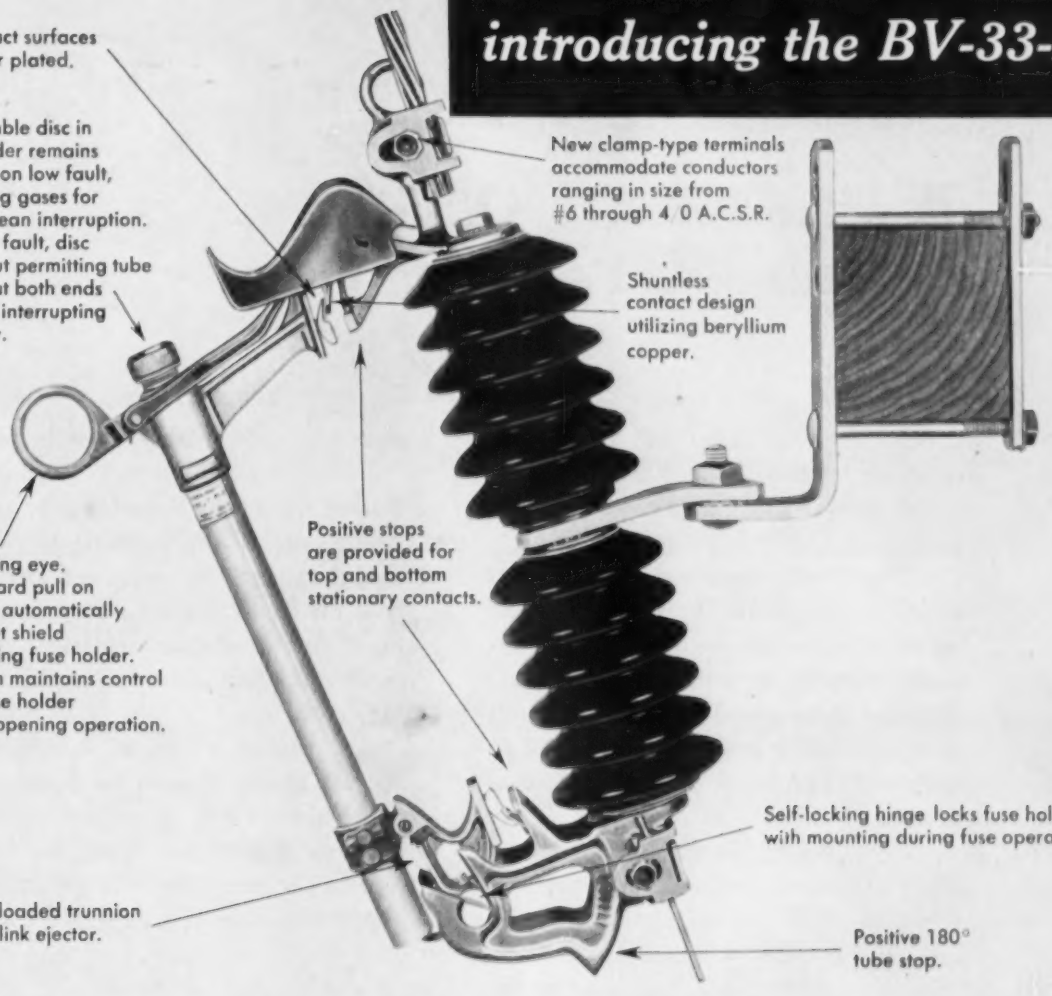
ADVANCE TRANSFORMER CO.

World's Largest Exclusive Manufacturer of Fluorescent Lamp Ballasts

2950 NO. WESTERN AVE. CHICAGO 18 ILL. U.S.A.

The Heart of the Lighting Industry

introducing the BV-33-F


All contact surfaces are silver plated.
Expendable disc in fuse holder remains in place on low fault, restricting gases for quick, clean interruption. On high fault, disc blows out permitting tube to vent at both ends for high interrupting capacity.
New clamp-type terminals accommodate conductors ranging in size from #6 through 4/0 A.C.S.R.
Shuntless contact design utilizing beryllium copper.
Operating eye. Downward pull on this eye automatically lifts sleet shield unlatching fuse holder. Lineman maintains control over fuse holder during opening operation.
Positive stops are provided for top and bottom stationary contacts.
Self-locking hinge locks fuse holder with mounting during fuse operation.
Spring-loaded trunnion acts as link ejector.
Positive 180° tube stop.

A Powerful New Southern States Cutout For Handling Restricted or Heavy Faults

CHECK THE FEATURES of the powerful new BV-33-F! Whether you are a lineman, or an engineer responsible for applying cutouts on an entire system, we believe the BV-33-F will meet your requirements.

Despite its exceptionally high interrupting rating the BV-33-F clears restricted faults quickly and cleanly. Secret of its success on faults of any magnitude lies in the expendable disc in the fuse holder cap. On low faults the disc remains in place, restricting gases within the tube for maximum arc-quenching ability. On high faults the disc blows out and the cutout double-vents for maximum interrupting capacity.

The BV-33-F can be easily converted to a single-vented SV-33-F by replacing the pressure relieving cap with a solid cap.

For additional information on these new cutouts contact your local Southern States representative.

CHECK THESE INTERRUPTING RATINGS

KV	Continuous Current Amps	Interrupting Capacity RMS Amps
TYPE BV-33-F		
5	100	8,000
7.5	100	8,000
15	100	6,000
25	100	4,000
TYPE BV-33-FH		
5	100	10,000
5	200	10,000
7.5	100	10,000
7.5	200	10,000
15	100	8,000
15	200	8,000
25	100	5,000

IN CANADA: Dominion Cutout Co., Ltd., Toronto

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

An answer for every electric utility

A PLANNED OUTAGE IS NO OUTAGE

Five hundred kw is not a large unit of power by utility standards. Not, that is, unless it is badly needed . . . and not available.

That's why more and more utilities are finding an increasing number of uses for the Electro-Mobile 500 kw highway-trailer generating unit. It can go anywhere, pick up a load in minutes, permit construction or maintenance crews to work without interrupting service to customers.

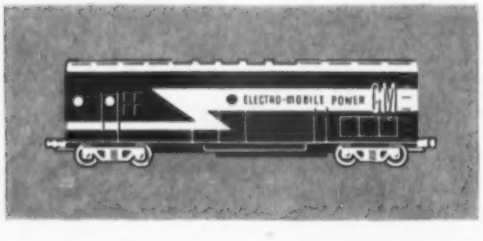
In addition, Electro-Mobile Power offers an immediate source of emergency power to areas that might otherwise be without service for a long period of time. Used in multiple, there is no limit to the amount of power these units can supply.

The savings from Electro-Mobile Power are many. Rebuilding or maintenance work of any duration can be handled during regular working hours. Work goes faster, in greater safety, and most important—customer relations and income are maintained during the temporary outage.

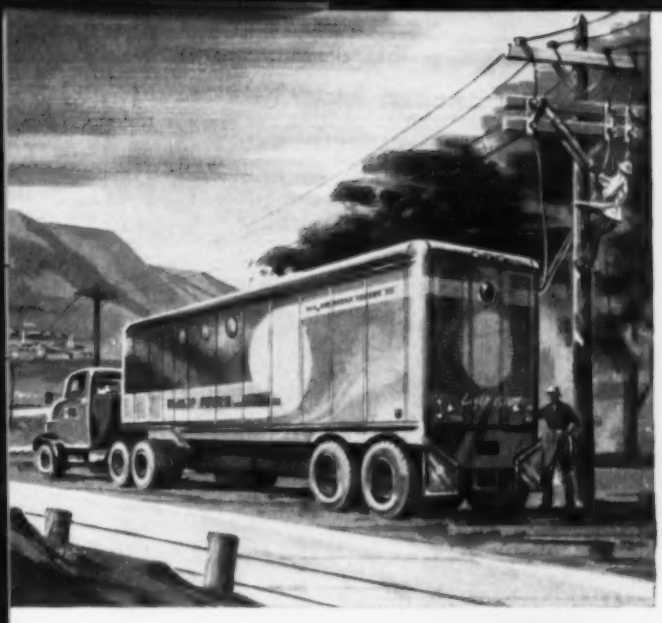
A planned outage is no outage with Electro-Mobile Power. Its many advantages are helping to reduce costs and improve service for many utilities. It can do the same for your system. Your Electro-Motive representative will be glad to show you how.

Here's how one Midwestern utility company uses its Electro-Mobile trailer . . .

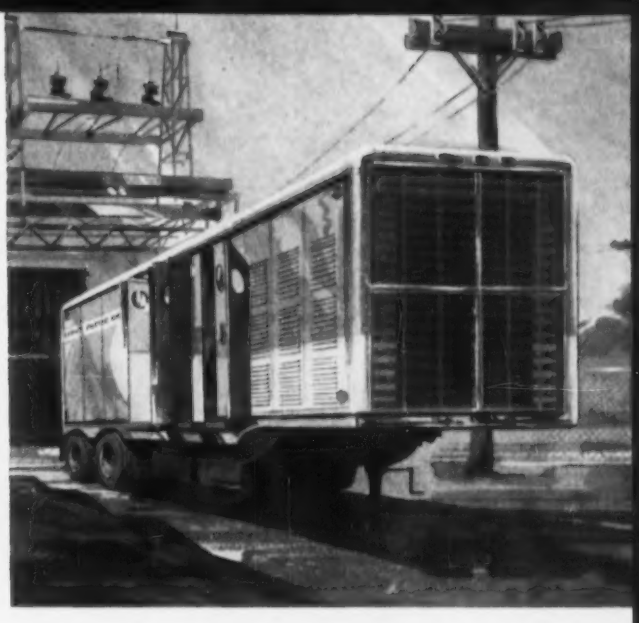
In a span of twelve months, this utility used its Electro-Mobile trailer on fifteen different jobs. Shown here are some examples of the work completed and in progress with this unit. During the year the mobile trailer was operated over 340 hours. On one job alone, it was used 145 hours, delivering 58,500 KWH.



Rail Car—develops 1,000 kw. For use on rail sidings or placed on piers for semi-permanent installation.

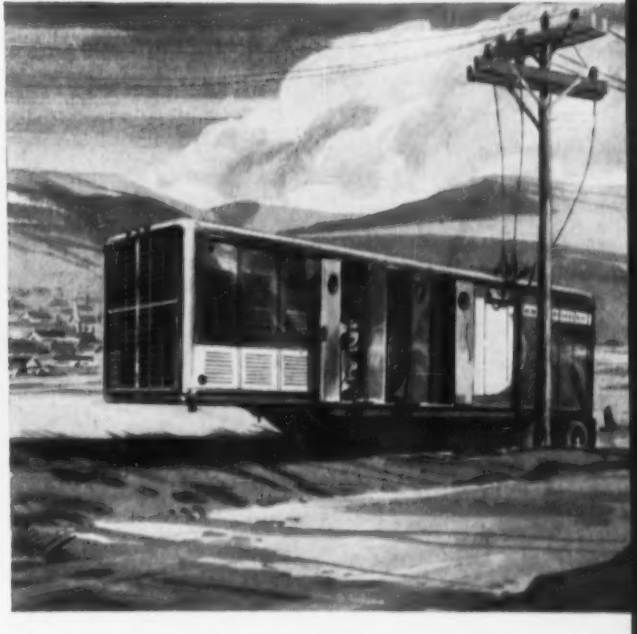


Relocating 12,400-volt line for new highway.
Hours used: 68 ¼ KWH generated: 22,700



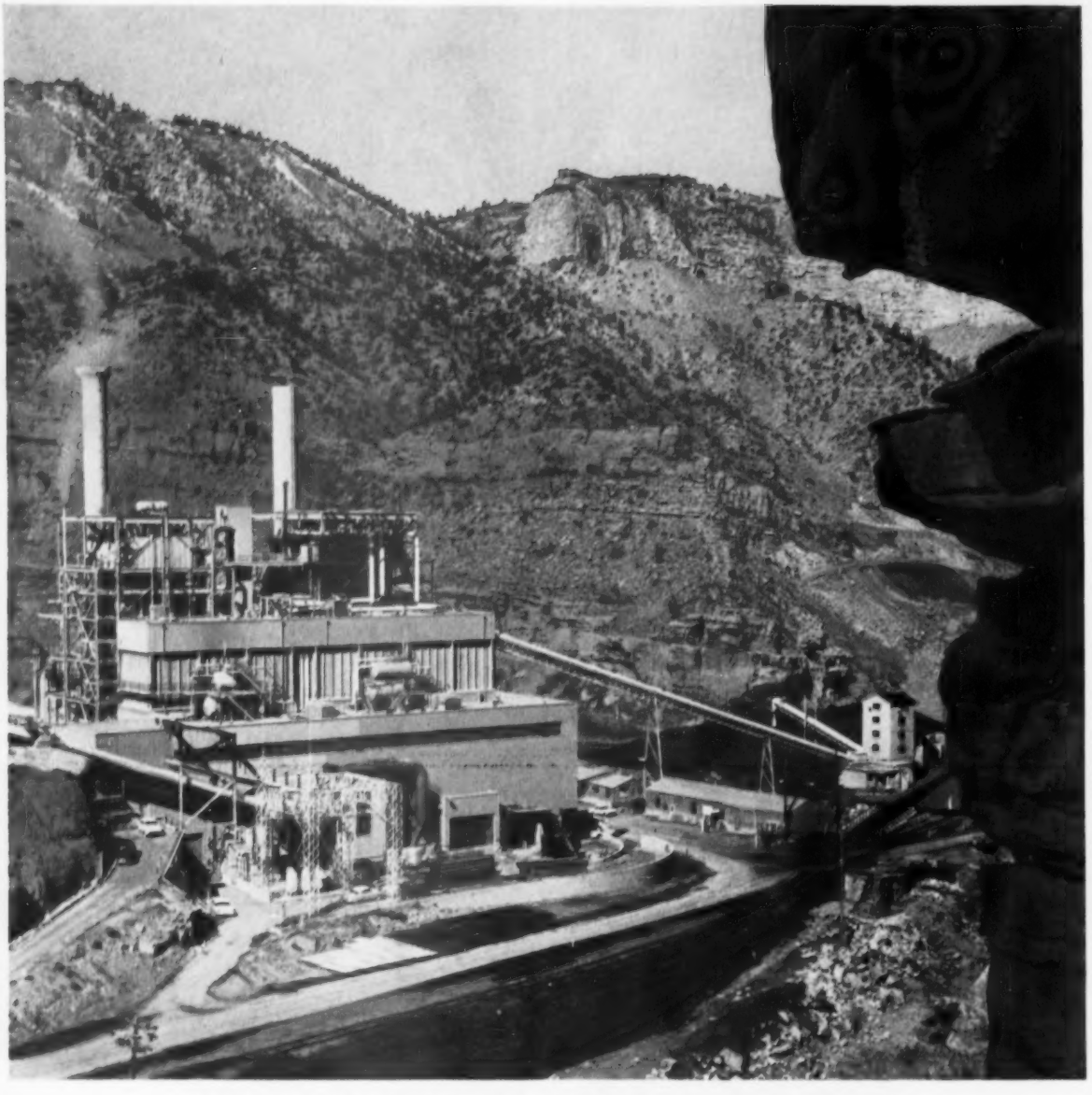
Installation of new transformer for substation.
Hours used: 3 ½ KWH generated: 1,100

Feeding 12,400-volt sub-transmission line while stringing new conductors on transmission line.
Hours used: 145 KWH generated: 58,500



Handling daily peaks while existing transmission line and substation are being rebuilt.
Hours used: daily average 4

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS LA GRANGE, ILLINOIS
Sales Offices in Chicago, New York, St. Louis, San Francisco



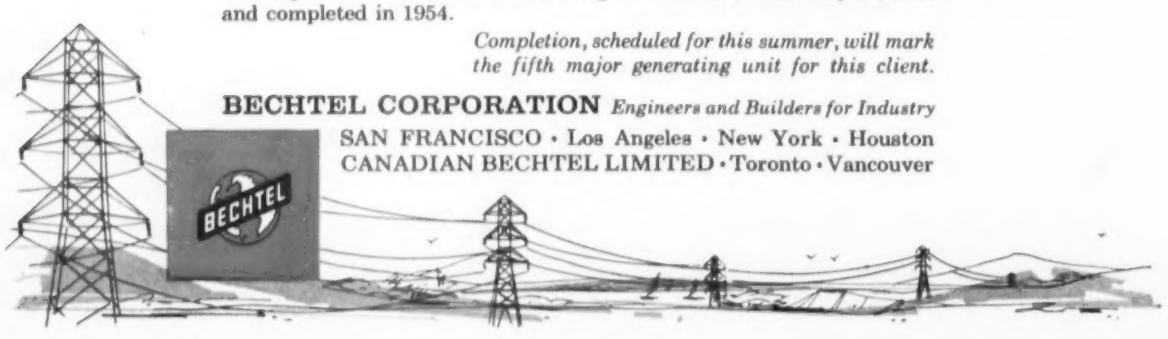
100,000 NEW KW'S FOR UTAH

A second unit, generating 100,000 kilowatts, is now being added to Utah Light and Power Company's Carbon Steam Plant, near Castle Gate, in Utah's coal country. It will more than double the present capacity of the power station, which was designed and constructed by Bechtel and completed in 1954.

Completion, scheduled for this summer, will mark the fifth major generating unit for this client.

BECHTEL CORPORATION *Engineers and Builders for Industry*

SAN FRANCISCO • Los Angeles • New York • Houston
CANADIAN BECHTEL LIMITED • Toronto • Vancouver



A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

Is Industry Creating A New Breed of "Bonus Babies"?

THE STARTING SALARIES offered to this year's June graduates give the impression that industry is creating a new breed of "bonus babies." This is the term baseball fans apply to sturdy youngsters whose talent for hitting and throwing gets them payments of up to $100,000 and other benefits for signing a contract.

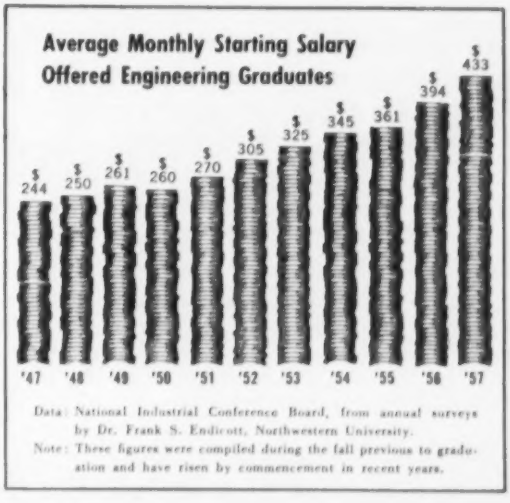
For several years industry's demand for young college graduates, especially in science and engineering, has outrun the number receiving degrees. Competition for these young people has steadily pushed up the starting salaries and has induced many companies to indulge in lavish recruiting programs. This year engineering graduates are being offered well over $400 a month, and even liberal arts graduates find numerous offers at $400 or more. Only ten years ago the salaries offered senior engineering students averaged less than $250 a month.

But any employer who assumes that high starting salaries alone will assure him the number of June graduates he wants is likely to be disappointed. A recent study by the McGraw-Hill Classified Advertising Division shows that most young engineers and scientists going into industry are more interested in their opportunities and in a company's future than they are in the size of their first paycheck.

Money Isn't Everything

In the McGraw-Hill survey, 2,596 recently-hired engineers and scientists employed in 57 companies listed the factors they had considered before accepting a position. The replies of the younger engineers and scientists—those with less than five years' experience — have great significance for employers who want to make any impression in the highly competitive market for college graduates.

- **Potential growth of the company** was listed by more young engineers and scientists than any of the 42 other items on the list as a factor that influenced greatly their decision in accepting a position.
- **Challenging opportunity** was second.
- **The company's prestige and reputation** ranked third.



Data: National Industrial Conference Board, from annual surveys by Dr. Frank S. Endicott, Northwestern University.
Note: These figures were compiled during the fall previous to graduation and have risen by commencement in recent years.

● **Progressive research and development program** was fourth.

● **Starting salary** ranked only **seventh.**

Job and Future Most Important

As a group, the factors relating to the nature of the job, its future and the company's future had by far the greatest influence in attracting young engineers and scientists to their present positions. These include three of the top four attractions—potential growth of the company, a challenging opportunity and a progressive research and development program. Other factors in this group are the company's facilities, quick advancement, self-direction or little supervision, chance to work in a certain field, small size of company and rewards for individual accomplishment.

The second most important group of attractions had to do with prestige. These include the company's prestige and reputation, executive or professional standing and association with leading men in the field. **Third in importance were financial considerations**—starting salary, regular salary increases, financing of relocation, paid vacations and holidays.

A less important group of factors influencing young scientists and engineers were essentially social. Geographic location and educational facilities in vicinity ranked fairly high. But recreational facilities, suburban or country living, pleasant housing and cultural considerations had little appeal.

Ranking lowest, by a good margin, were factors having to do with security—permanent position; health, life and surgical insurance; retirement or pension plan; and sick leave.

It is interesting to note that some of the factors which influenced the **smallest** percentage of young engineers and scientists were country club memberships, use of company car, at-cost or low-cost eating place, travel opportunities abroad and being able to buy the company's products at a discount.

A Lesson For Employers

The lesson of this survey to employers who hope to recruit more young engineers and scientists is clear. High salaries and other financial appeals are important. But, **at a time when high starting salaries are offered in abundance, our young graduates are interested even more in being with companies that will grow and in jobs that will permit them to grow. They are interested in jobs that offer opportunities for advancement, financially and professionally.**

* * *

Were the young scientists and engineers who participated in the survey trying to impress somebody with their motives? If so, it could only have been to impress themselves, for all were asked to return their questionnaires unsigned.

What Factors Influence the Job Selections of Young Engineers and Scientists?

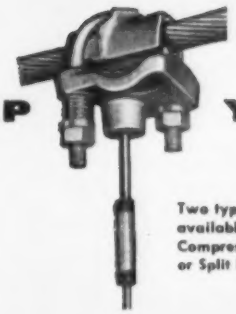
Factors Influencing Decision Greatly	Percent Listing Factor
Potential growth of company	55%
Challenging opportunity	53
Company's prestige, reputation	44
Progressive research and development program	41
Geographic location	37
Permanent position	35
Starting salary	34
Educational facilities in vicinity	33
Regular salary increases	31
Chance to work on specific project, or in certain field	27
Company's facilities (laboratories, technical libraries, etc.)	25
Tuition for graduate study	25

Based on replies by recently-hired engineers and scientists with less than five years' experience to questionnaire distributed by McGraw-Hill Classified Advertising Division.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw
PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

A U-BOLT CLAMP  YOU CAN WORK HOT!

Two types of taps available: with Compression Fitting or Split Bolt

BLACKBURN

Choice of Alumilited Hex Nuts or Plated Malleable Basket Nuts

Here's a hot line clamp with all the advantages of a U-bolt connection. Reduces costly service calls and burn-downs. Costs more than conventional hot line clamps—*and worth it!*

Castings and hardware of aluminum alloy.
Standard tap of tin plated bronze—compression tap of aluminum.

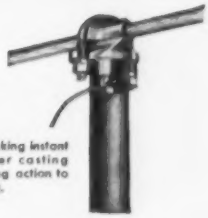
Main—3/0 to 336.4 ACSR—4/0 to 400 MCM AWG
4 to 2/0 ACSR over Armor Rod
Standard taps—from 6 AWG to 2/0 AWG
Compression taps—from 6 to 4/0 ACSR

Patent Applied For

SWIVELOK

Hang over conductor with shotgun stick...

Slam it home and let up on stick.



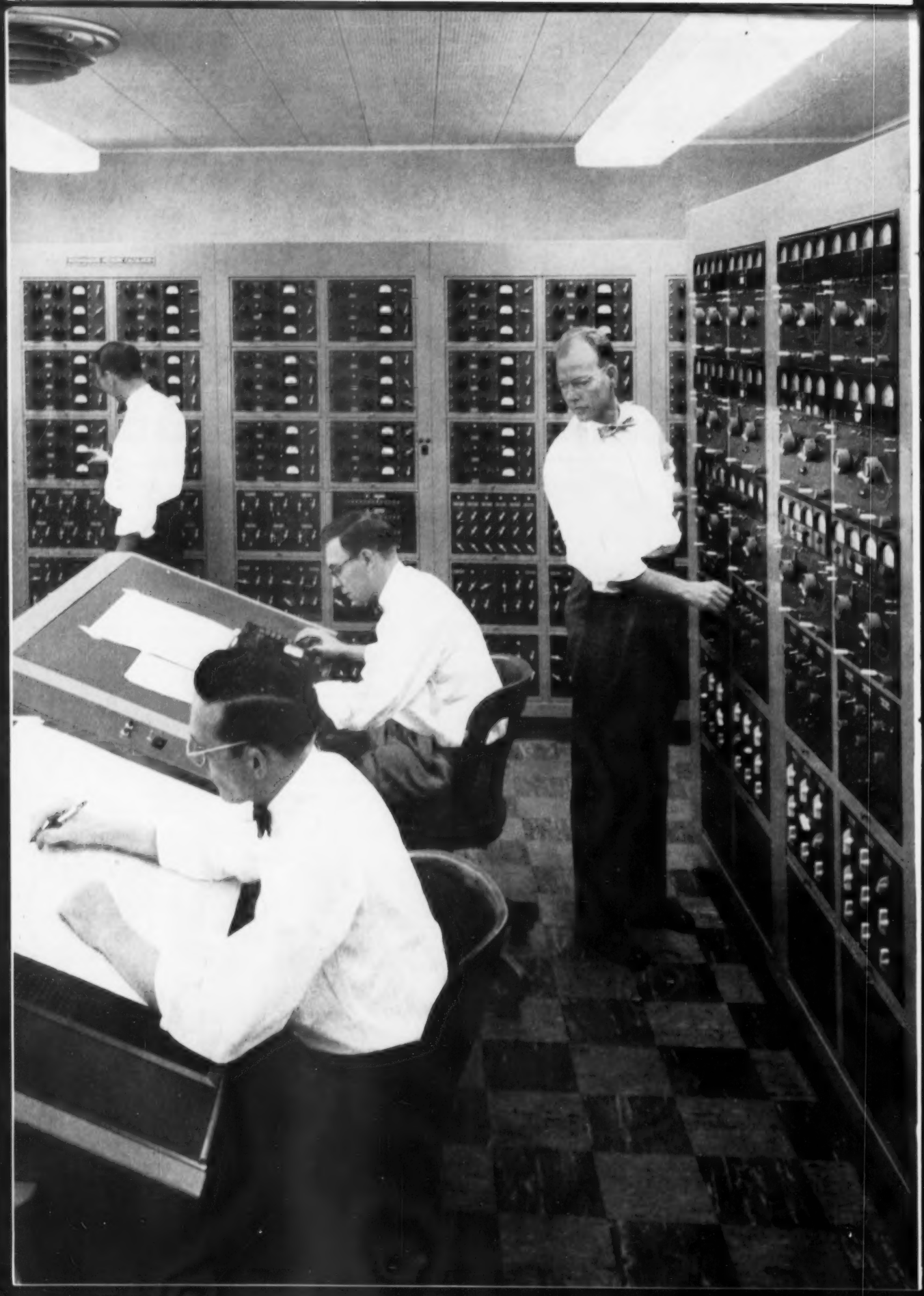
Up it pops, making instant contact. Lower casting provides wiping action to prevent arcing.

Tighten nuts and you have a trouble-free connection.

Send for your FREE SAMPLE Today!

JASPER BLACKBURN CORPORATION

1525 WOODSON RD., ST. LOUIS 14, MO., WYdown 3-9430



Helping the Industry meet its growing loads

The creative abilities of 750 engineers unshackled each year

Each year, Westinghouse "machines that think" have been taking over more and more tasks that steal an engineer's time. Performing calculations in less than 1% of the time required by the engineer, these machines give him more freedom for creative planning.

This year, again, computer facilities in the Analytical Department at the Westinghouse East Pittsburgh works are saving utilities over a million and a half hours in engineering time . . . unshackling for a year the equivalent of 750 engineers.

These extraordinary facilities—developed by Westinghouse—are doing tomorrow's planning today . . . planning power transmission systems far into the future, solving the complex problems of automated power plant operation. Computer studies solve problems which, because of the time factor involved, have never before been economically practical for thorough study.

These modern research tools will save weeks, months, even years, over the time it would take to solve your system problems by ordinary means . . . another example of Westinghouse leadership in helping the utility industry meet America's growing electrical load—faster and more economically.

J-97210

YOU CAN BE SURE...IF IT'S

Westinghouse

'HIDDEN' EQUIPMENT—There's a five-state power network in this picture, complete with generating stations, power lines, homes and factories. When this picture was taken, the calculator was "answering" questions about a future power network. Seated at instrument desks, W. E. Furniss (left) takes down "answers" read by L. J. Rindt. R. W. Smith, West Penn Power Company engineer, looks on. In the background, R. H. Swanberg, Chief Operator of the calculator.

A-C Network Calculator

Foremost among the machines serving the utility industry at the East Pittsburgh works is the world's largest a-c network calculator, with 36 generating stations and 580 circuits. This electronic marvel simulates every part of an actual power system—transformers, generators, transmission lines and loads—and is used in studies of very large systems.

Ranking high in importance of the studies performed on the a-c calculator are those of power system planning. In general, these fall into three classes:

1. *Load division or voltage regulation studies*—generator power factors, location of system components for best over-all results, system losses, location of new system components.

2. *Transient stability studies*—power limit of lines or portions of a network, optimum switching time for faults, effect of various bus arrangements.

3. *Short-circuit studies*—breaker duty, effect of different methods of grounding, both phase and ground short-circuit currents, mutual coupling and ground current—inductive coordination.

Other Computers

Other Westinghouse aids to economic power generation and distribution include digital computers, analog computers, electronic differential analyzers, and the d-c calculating board. The Analytical Department is fully staffed with men thoroughly experienced in programming information for virtually every type of study which can be made with these machines.

ELECTRA'S HUSBAND

Shortest Way Home

A group of us, mostly manufacturers' representatives, were sitting around the lobby of one of the fancier Western resorts waiting for the bus to take us to the airport some 60 miles away. The convention had been a huge success to judge from the morning-after expressions on most of the faces.

One of the group commented wearily: "What gripes me are my customers who keep telling me what a great thing it must be to be able to travel to all the conventions, eat at all the best restaurants and live it up on the expense account. I wish some of them had to follow me around for a couple of months, nurse my hangovers and fight to get a little transportation on Friday night so you can get home to the family for the week end."

"To paraphrase an old adage, the lot of the peddler is not a happy one." This sage comment came from another of the group who continued: "At least at this convention we are the lucky ones. Did you hear what happened to Bill?"

After receiving a chorus of "nos," the speaker continued: "Well, you all know that Bill is not the best forward planner when it comes to laying out a travel schedule. As a matter of fact, I don't think that his company's transportation department is too much on its toes because he arrived here with reservations back to San Francisco on a hedge-hopping flight that practically took the polar route. Of course all his friends were very free with their advice as to the best way to get home so they fixed him up in great shape."

"I may have had a little bit to do with that myself," I said contritely. "I merely mentioned the fact that there was a direct flight to San Francisco early this morning out of Boise."

"That may have been what touched off the fuse," continued the narrator, "because Bill was scrambling around trying to find someone who was driving over to Boise late last night."

"I guess he made it all right," said another of the group. "At least I haven't seen hide or hair of him this morning."

"Oh, he made it all right," went on the first speaker, "after about $19 worth of calls to the airport. And he got transportation to Boise, too. Only he had to travel pretty light."

"What do you mean by that?" asked another of our companions.

"Well, you know the way Bill travels. He always has a suitcase full of the smaller samples, a Dictaphone and then another couple of bags to handle his wardrobe. The car that was going over to Boise last night had room for one body but no bags so Bill did some more scrambling around. Art and his wife, Helen, of Consolidated Metals had driven up here in their new station wagon and very kindly offered to haul Bill's luggage back to San Francisco today. So Bill left last night with only his shaving kit."

"I've got news for you — and Bill too." This was from another of the group who happened to wear a Consolidated Metals brand. "Art got a long distance call this morning and had to take off to Spokane to meet our chief engineer. I hope Bill didn't pack his complete wardrobe for this trip as it may be a little while before those bags get back to San Francisco."

"I'd like to see Bill's face when he hears that," I said. "Or better yet I'd love to transcribe his comments."

The bus had arrived and we all straggled out to load our luggage and head south to the airport. Two hours later, as we were filing up to the ticket counter to check in we heard a yell across the lobby and Bill came rushing up.

"Boy, am I glad to see you fellows. I've been sitting here in this hole since 7:30 trying to find somebody to join me in a consolation drink. You'll all be happy to know that you're going to have the pleasure of my company on your flight to San Francisco."

"Why, I thought that you had reservations on the early plane," I said. "What did you do, oversleep?"

"Oversleep, nothing," retorted Bill. "After spending half my month's budget on telephone calls to get me an assured seat on that flight, the jerks at the airline had their records fouled up. The plane came in full, and it went out full—without me. I ought to sue 'em."

"I'm beginning to believe that this isn't your day, Bill," said the man from Consolidated Metals. "You'd better come over here to the bar and sit down before you get the next jolt. Art and Helen are on their way to Spokane and they'll be back in San Francisco sometime toward the latter part of next week. I hope you have nothing perishable in your luggage."

Bill took the news much better than we had expected. "That's all right," he said. "I've got another suit in San Francisco and I figured on staying in the office all next week anyway so I won't need my samples."

Just then the airport paging system blatted out, "Mr. Jones, will you please come to United ticket counter. Mr. Jones to the United ticket counter, please."

Bill jumped as if he had been prodded with a hot iron. "If there's anything wrong with my reservation now, I'm going to tear the airport apart piece by piece." He got up and walked over to the counter. When he returned, he was practically stepping on his chin. In fact, he looked so lugubrious that all of us burst out laughing.

"Do any of you guys know a nice monastery that I could retire to? That was not the airline—it was even worse, my boss. He tracked me down here and wants me to meet him in Denver tonight. This shouldn't happen to a competitor. My clothes are in Spokane, my wife is in San Francisco waiting to celebrate our wedding anniversary tonight and I am on my way to Denver with a shaving kit."

"Cheer up, Bill, there's just one more thing that could cap the climax to this trip for you."

"What's that?" asked Bill. "It seems to me I've had it."

"Well," needled his friend, "the boss probably wants to see you in Denver about moving you east to richer and greener pastures."

Bill collapsed into a lounge. He didn't even wave good-bye as we filed past to get on the California bound flight.

NO CORNERS
where Rust can start

Internal Clamping of Bushings Provides Smooth External Surface... Cuts Maintenance Costs

Rust always gets in its destructive licks around sharp corners. To eliminate these vulnerable spots, Allis-Chalmers has developed *internal* clamping arrangements for bushings.

New Bushings

All external hardware has been eliminated without changing the effective method of gasketing. The new two-piece low voltage bushings compress and seal the tank wall gaskets through clamping pressure applied by the bushing studs. High voltage cover bushings are held internally by a keeper plate and spring arrangement.

Reducing your maintenance and upkeep costs is a continuous project at Allis-Chalmers. Get the complete story from your Allis-Chalmers representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5327

editorial views

Real Estate Wanted

NOT the least of the growing complexities of system design and operation is a commodity which the West used to think it had in abundance, namely, real estate. Growing population densities in the metropolitan areas obviously increased the time and expense involved in procuring plots and rights - of - way for electrical facilities. Then there is the growing public appreciation of aesthetic beauty and creature comfort which has not yet learned to look upon the stark outlines of a distribution pole or listen to the hum of a substation transformer with complacency. The penchant for the winding street in the newer subdivisions often leaves the distribution designer and easement procurer with the impression of having dealt with a Chinese maze.

As difficult and as frustrating as some of the current real estate problems may be, they only give a hint as to what may be expected in the future. Real estate may very well be one of the dominant factors that should be worked into long-range system planning that is being done today. A decade from now real estate costs may be prohibitive in the more densely populated areas — but the load density in those areas certainly is going to increase substantially in the interval. A decade from now existing rights-of-way for transmission circuits may be priceless—but those rights-of-way may be called upon to carry double or triple the amount of energy that was originally intended. A decade from now an existing substation site may have to be turned into a multistory structure because there is no place to go but up. A decade from now a good thermal plant site probably will have to satisfy all the requirements of nuclear safeguards and restrictions as well as having all of the other common attributes that make them even difficult to find today.

As the rate of growth increases, as it is in the West, it becomes more and more imperative to extend the planning for the future facilities still further ahead. An astute system planning organization today can save millions of dollars in the future. It is not enough merely to plan for facilities that will meet tomorrow's loads. It is imperative to plan those facilities so that they can be integrated into the system and into the community for the lowest over-all cost. All this involves far - sighted real estate transactions, uninhibited thinking concerning system design, and probably some hard-hitting selling to keep management aware of the probable economic picture a decade or two hence.

Check and Double Check

CONDUCTORS and machines are not the only place that losses can occur on the system. The accounting department also is concerned about losses —but not of the thermal type. They deal with dollars and cents and look with raised eyebrows when the engineering department comes up with a casual loss of a few kilowatt-hours of energy.

It's amazing how many different ways there are to divert funds from their proper channels in a utility system. W. E. Littler of Southern Nevada Power enumerated them in his paper before the spring meeting of PCEA's Accounting Section. But he also listed the ways of forestalling the misuse and misappropriation of such funds in a very able discussion of protection against defalcation. As an example of the scope of the paper, there are listed more than 200 questions in the check list for review of accounting procedures and internal control. This is merely preliminary to discussions of how to thwart carelessness, dishonesty and downright thievery.

As you read the paper, respect for the accounting department grows by leaps and bounds. Its personnel, aside from keeping the figures straight, apparently have to be trouble shooters and detectives as well. They must be doing a good job, too, for little is heard about the misap-

propriation of utility funds. That could be because procedures are good or because surveillance is continuous, or because the utility business attracts nice people to its ranks. We like the last reason best of all.

This Is Our System

"THE economic system of this country is poorly understood or positively misunderstood, not only by the enemies who wish to present America in an unfavorable light, but also by friends of this country and even by the American people themselves."

With this statement, 12 distinguished Americans assembled in forum at the American Round Table, co-sponsored by Yale University and the Advertising Council, proceeded to analyze the reasons for this situation. The fantastic misconceptions about the capitalistic system that prevail make it imperative to devise ways of explaining it more clearly to people here and abroad.

The Advertising Council has given a new name to the system, "People's Capitalism," and called it "an apt and appealing term, which should aid in the undertaking of a fresh and unstereotyped view of our system." The panel made these interesting observations:

1. Of all the great industrial nations, the one that clings most tenaciously to private capitalism (the United States) has come closest to the socialist goal of providing abundance for all in a classless society.

2. People's Capitalism has flourished because the people have a chance to vote with their dollars in the market place, thus deciding for themselves what is to be produced instead of taking what the government decides to provide for them.

3. The American economy has steadily approached the highest goals of People's Capitalism because (a) wide distribution of the policy-sharing processes in the economy either through the consumer making his choices in the free market or through distribution of control by distribution of ownership; (b) recognition among business and labor leaders that economic enterprise must be conducted with regard for the public good; (c) public demand for a rising, dynamic way of life; and (d) broad distribution of the benefits of the economy among the population.

4. American capitalism presents the picture of an extremely highly developed technology at work upon an unparalleled wealth of natural resources. Resources become wealth only when people have the organization and the skill to use them effectively. The American Indians had all the resources we have today but received little benefit from them.

5. Underlying the American economic system has been spiritual ideas that have been fostered since the birth of our country. These ideas stress the merit of economic endeavor, economic progress and economic gain. Poverty has never been considered a virtue in this country. These spiritual ideas have contributed to a moral commitment of fair play and self-restraint, enabling the economy to control itself, in part, without being subjected to rigid or pervasive government controls.

6. The American ideal of equality of opportunity has fostered the growth of People's Capitalism by creating high goals for the population and thus stimulating their economic energies.

7. The ideal of a classless society, though never fully realized, has reinforced the ideal of equality of opportunity by creating the belief that no man is confined to a fixed status and that every man has the opportunity to forge ahead.

The panel came to this conclusion on promoting People's Capitalism abroad: It is clear that the American model is not duplicatable in its entirety and it would be paternalism for us to act as if it were. Therefore we must strive to present our system with clarity and in terms which will show how others may avail themselves of parts of it for use that will vary in every instance. The Soviets have made a great error in refusing to let other peoples come to socialism in their own way. We must be more flexible than the Russians by recognizing that peoples of other countries can come to people's capitalism in their own way.

The detailed discussions of the round table are available in pamphlet form from the Advertising Council, 25 W. 45th St., New York City. Copies might be useful to speakers as background material; are a good reading rack item.

Consumer Appliance Cost vs. Distribution System Expenditures
Visualizing Circuits, Substations, and Their Voltages at Future Load Densities
Outage Performance of 12, 23 and 34.5 KV Primary Distribution Voltages Compared to 4160 V
Projecting Into The Future

NOW IN ITS NINETEENTH YEAR, "Distribution" is published quarterly by General Electric and has a circulation of 22,000 among distribution engineers in electric utilities and consulting engineering firms. Thought-provoking editorials by Editor D. K. Blake, Manager—Power Distribution Engineering, are one reason "Distribution" is preferred reading among utility men and the magazine's circulation continues to grow.

TWELVE YEARS OF PUBLICATION sees "LOAD" of increasing benefit to utility power sales engineers and people in related fields. It presents practical ideas and information to help electrify industry. Editor C. A. Walter (left) discusses a forthcoming issue with R. Cutts, Jr., (right) Mgr.—Electric Utility Industry Sales Development, and F. W. McChesney, Mgr.—Light Manufacturing and Service Industries Sales Development.

Distribution and LOAD:

Why do 32,000 utility men read them?

Rigid criteria are applied to see that each issue of these General Electric magazines provides useful information

The long-time popularity of these magazines can be attributed, in great measure, to these simple questions posed by the editorial staffs before any article is accepted for publication: For "Distribution": Does it help the distribution engineer? And for "LOAD": Does it help the power sales engineer? This is the acid test, and all articles must pass it. Articles for "Distribution" are authored by General Electric engineers. Often these articles are developed in co-operation with utility men. "LOAD" acts as an industry-wide idea exchange medium and clearing house through articles written mostly by utility power sales engineers.

The editorial staffs responsible for these two magazines are men drawn from a wide variety of product, service and engineering experience at General Electric. Each can speak with authority in his field, and each has his fingers on the pulse of contemporary trends and developments. The end results of their efforts, in co-operation with utility and General Electric authors, are two magazines of real service to the electric utility industry.

If you are not yet receiving "Distribution" or "LOAD", and wish to, just write The Editor, Distribution Magazine, or The Editor, LOAD Magazine, General Electric Company, Section 301-360, Schenectady 5, N.Y.

LIVE BETTER ELECTRICALLY

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U.S. VOL. 119 NO. 2 AUGUST 1957

—Present contractor-union agreements are based on heavy construction work

—Yet one-third of electrical construction business is in residential and small-business fields

—Why is this important potential by-passing the union contractor?

Maybe We Should Try A New Approach

A. R. Woolley
Manager, Intermountain Chapter, NECA
Salt Lake City, Utah

Ours is an industry of importance. The total electrical contracting volume for the year 1956 exceeded $4 billion dollars, and it is estimated that 1957 will be even more. This represents an increase from approximately a $1.3 billion volume in 1950 or, in other words, during the past six years our industry has grown more than three times in the total amount of electrical work done.

This being true, we can appreciate the fact that indeed the electrical contracting business is an industry of importance and as such it is deserving of better treatment at the hands of the electrical contractors themselves than it has been getting. Above all, we should cease selling ourselves short. This is a business deserving of higher values and it is deserving of better and more enlightened management.

It is in this field of management that our room for improvement is greatest. This does not mean that we minimize the importance of labor and de-emphasize that in any manner, but it does mean that management should take its rightful place. Both labor and management are essential as a team, if we overcome our mutual problems. Overemphasis on either is detrimental to our progress and growth.

Labor, through organization, has gained a position of pre-eminence or top rank in the field and in doing so some of the importance has been taken from management, leaving management in a secondary position. This is not a condemnation of labor in any sense, but it is a condemnation of management, and it is management that now needs the urge for improvement. This improvement should come not at the expense of labor, but with the help of labor's example.

It is time that we changed our thinking in management and gave ourselves the dignity and importance that we deserve. A new type of thinking is necessary—a new approach to our problem. Not to tear down labor but to build up management and produce a lessening of the conflict and a better understanding between the two. A little more, if you please, of a mutual admiration for both.

Labor is militant. It has been trained to fight, and by organizing it has become strong. However, management should not regard labor as an adversary and we should not deplore its strength. Rather it is a strong ally and management should strive for equal strength — equal strength, not to defeat labor but to strengthen our industry and put it in its rightful position in the economic situation of today. In this struggle for economic position and stability, labor is not our adversary. Labor is on our side.

Our adversary is an host of many other things, conditions and people. To name a few: It is the general contractor who does his own electrical work or tries to. It is the utility company which does not recognize our position in the industry and so does its own work. It is our suppliers who do not recognize our position and follow outdated sales policies to our detriment. It is the industrial plant which does its own work or tries to. It is the commercial establishment which does its own work or tries to. It is the individual who does his own work or tries to.

We can sum it up by saying that our adversary is the do-it-yourselfer, be he person, firm or corporation.

Labor and management should both take a good look at our agreements in the light of present-day results after the past 10 years of our relations. It might be that such a second look would indicate that some of the things we have negotiated into our NECA-IBEW agreements over the past 10 years have already proved themselves to be bad for our industry.

While union recognition of contractors has grown, can we say it has grown as rapidly as our industry? When we consider that the volume of electrical contracting work has increased three times in the last six years, is it true that union recognition of contractors has kept pace with this growth? Are there fewer nonunion contractors today in relation to the total number than there were 10 years ago? Or even six years ago? Do union men today do as

This Is the New Article in Its Union Agreement being considered in the Intermountain Chapter

Shop Journeymen

Wages and Conditions

Sec. 1. Definition of a Shop Journeyman. Within the meaning of this agreement a shop journeyman is a journeyman member of the IBEW who has, by mutual agreement with his employer and ratified by a duly called Joint Conference Committee, agreed to work under the terms and conditions as outlined in this article.

Sec. 2. Forty hours to constitute a work week, Monday through Saturday. The application of the 40 hours in any calendar week to be mutually agreed to between the shop journeyman and his employer. Holidays occurring within the week count as eight hours worked.

Sec. 3. All work performed beyond 40 hours in any one calendar week shall be paid for at one and one-half times the regular rate. Regular rate to be the shop journeyman's weekly rate divided by 40. Work performed on the following holidays: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day, to be counted as double time, two hours for each hour worked.

Sec. 4. After one full year's employment for one employer, a shop journeyman shall receive a vacation with pay of two consecutive weeks, or as he may choose to take his vacation time with the approval of his employer.

Sec. 5. After one full year's employment for one employer or sooner at the discretion of the employer, a shop journeyman shall receive a health and welfare plan, paid by the employer up to a cost of $4 per week. Any premium in excess of this amount to provide additional protection desired by the shop journeyman, to be paid by him. The Joint Conference Committee shall select the health and welfare plan to be used.

Sec. 6. The employer agrees to provide the shop journeyman a minimum of 39 full 40-hour weeks employment during the 12 months' period following date of employment, and agrees further that if employment is terminated for any reason at the end of 39 weeks but before 52 weeks have elapsed, to pay for two additional weeks time, one-week vacation time and one-week leaving allowance.

The shop journeyman agrees that if he terminates his employment at any time for reasons of his own, he will sacrifice any leaving allowance accrued for him.

Sec. 7. The employer agrees that if causes arise which, in his opinion, justify the dismissal of a shop journeyman, he will for his own protection submit his causes to the Joint Conference Committee. Should this committee rule that such causes are in effect justifiable, the shop journeyman may be laid off or discharged without further obligation being imposed on the employer.

If this committee rules such causes to be less than justifiable for layoff or dismissal, the employer agrees to pay the shop journeyman a leaving allowance of one week's pay for each year or major fraction thereof of employment under this article, plus any earned vacation time not already paid. Vacation time for the purpose of this clause will accrue at the rate of one week for each full six months employment accrued for only one year.

Sec. 8. The minimum guaranteed weekly wage for shop journeymen shall be as follows:
In the Grand Junction and Durango areas..$_____per week
All other areas.....$_____per week

Sec. 9. It is hereby agreed between both parties that the intent of this article is to remove existing obstacles tending to prevent mutual recognition by the union and the contractors who perform residential and small industrial- or commercial-type work of the nature not usually handled by formal bid practices. However, the restrictive conditions and guarantees mutually assumed by the contractor and his shop journeymen are such as to prevent the manning of any substantial amount of work in the construction field with shop journeymen, but the occasional and temporary use of shop journeymen filling in on regular construction when necessary to maintain his productive status is recognized by both parties.

much of the total electrical work percentage-wise as they did six years ago?

It would seem that, if they did, the number of union members of the IBEW should have increased about three times in the past six years, and we, of course, know that this is not so. On the contrary, the IBEW is hard pressed to maintain its construction membership equal to a level of six years ago. A study of the total IBEW pay roll in the construction field as shown by the reports of the National Electrical Benefit Fund payments, adjusted for compliance and rate changes over the past six years, proves this.

Do union men do as much in residential wiring in ratio to the total work in that field as they did six years ago? We know the answer to that one too, and it is a strong NO. What is the answer in the commercial field? The industrial field? If the amount of nonunion work in ratio to the total is increasing and not decreasing, can we say that union operation is gaining?

If union operation is not gaining in proportion to the industry gain, should we as management be concerned? I think we should. We should be concerned for one reason alone, if no other and there probably are many, and that is that the nonunion segment of our industry as a group is responsible for the tearing down of conditions and prices conducive to profit.

What Union Provides

The basic and probably most important function of organized labor is the creation and development of a skilled manpower pool. No electrical contractor can train and maintain in continuous employment his entire labor force required for his volume of business, because no contractor can predetermine his week-to-week labor requirements. The larger the contractor, the more impossible for him to do this. The union fills this essential better than any method yet devised and this basic fact ensures the continuing existence of unionism, unless the existing organizations are replaced with something of a similar and competitive nature.

Organized labor in some form in our economy under our free enterprise system can not be replaced without loss of both efficiency and productivity. Any possible replacement must be in itself an organized labor pool. Antilabor legislation cannot and will not destroy organized labor in the construction industry and, while deplored, need not be feared. Only a collectivist-type government can substitute for organized labor, and our modern-day examples of this type of substitution do not encourage the process.

How, except through organized labor, can we ensure the training of apprentices in adequate numbers and with control over that training? How, except through organized labor, can we encourage the young men needed in our industry to apprentice to the trade? How, except through organized labor, can we be sure of a uniform labor cost for our industry? How, again, can we expect to improve and increase the knowledge and skill of our workmen? What plan for security could be offered to apprentices and journeymen as is now available through our

National Electrical Benefit Fund? How could we substitute for our present apprenticeship program or our method of preventing costly strikes and production losses through our Council on Industrial Relations?

Have NECA and the IBEW properly exploited these advantages offered by organized labor, and do our agreements encourage and not hinder a broad acceptance of the principles of organized union labor? If not, and I'm afraid the answer is no, can either labor or management refuse to accept the blame?

Remember NECA is the bargaining agent for management and on it rests the responsibility for our present-day agreements. I'm afraid that it can be said with too much justification that contractors have been influenced in their bargaining with labor with ideas of protection rather than for the good of our industry, and that we have used our influence at the bargaining table to set up barriers, through our agreements, that restrict the coverage of union recognition.

Nonunion Competition

We all readily admit the severity of nonunion competition in the residential wiring field, for which we blame the union. The contractors cannot hold themselves blameless in this regard, because we have not honestly tried to help our unions find an answer to this problem. Therefore, I think we are both at fault—both labor and management.

NECA and the IBEW have jointly negotiated agreements covering construction, and with construction only in mind. Much talk has gone across the table regarding the problems of the ding-bat type of work, but no answers have been put into effect. We contractors want the union to recognize other contractors now doing this type of work on a nonunion status, but we insist that they must be recognized under the terms of our construction agreement.

This insistence just drives these contractors further away and the union has found it impossible to gain their acceptance to the terms under which they would have to live if they recognized the union. We claim this position protects us. It protects us from what? From participation in more than one-third of our industry's business volume!

At the NECA national convention in New York in 1955, Gordon Freeman, president of the IBEW, made the remark that if NECA contractors do not recover with the union the segment of work now lost to the nonunion contractors, they are determined to get this work back through another group of contractors. This means that they recognize at the international office the necessity of approaching the contractors now doing this type work with agreements that they will accept and, by the same token, agreements less stringent in their requirements than the one under which we operate now.

Since this segment of work now represents more than one-third of the electrical contracting volume today, it behooves us to take this matter seriously, and to do something about our present agreements. If we don't do something now about this one-third segment, what happens when it becomes one-half or even more of our total volume? These nonunion contractors now successfully securing this segment of our work are doing so under terms they find acceptable to the John Doe Public, and these terms are not those under which we operate at present.

It would appear that for this work we must eliminate the stipulation of the eight-hour day, between 8 o'clock in the morning and 5 p. m., and a work week of Monday through Friday. Rather our work week might be Monday through Saturday, with 40 hours constituting a straight-time week and eight hours a straight-time day, regardless of what hours are worked and when; with overtime starting after 40 hours of work in any one calendar week or eight hours in any one day.

Permanent Employees

It would also appear that the men doing this class of work might be called upon to fill in time doing other than straight electrical installation work. Likewise these men become permanent employees in the firm for which they work. They are not subject to being added to or laid off the pay roll in the same manner that construction workers are. Therefore they might be put on the guaranteed type of weekly, monthly or annual wage.

These men might have other advantages. Since they are permanent employees of the firm, they might properly be considered for paid vacation and participation in an health and welfare plan. In other words, they grow up with the owner in his business, and they become a permanent part of it.

This type of employment should not be considered in the same light with the employment accomplished under our present construction agreements. These men cannot be too closely restricted in what they are going to do. There must be freedom of movement, within the structure of this agreement we are talking about, for the employer to conduct his own business as he sees the necessity for doing so. Since these men will still be IBEW members, the fact that they might do some construction work interspersed in their regular operation does not seem to be a problem. This would not be taking work away from any present IBEW member. Rather it would be adding to the IBEW membership.

It is argued by some contractors that a broad, unrestricted union recognition among contractors would increase their competition on the work commonly controlled through the building trades group. But such an argument has no demonstrated proof, and it implies that there would be no reciprocal advantage accruing to the present union contractor by increasing his potential market by over 33 1/3%. At the same time, it would establish a fixed cost pattern to apply where one does not now exist. In face of these apparent facts how can we be so blindly satisfied that our present answers are the right ones.

Beat by Our Own Club

It can be argued that our efforts to protect the union contractors through our agreements have only resulted in holding an umbrella of protection over our non-union competition. We refuse him membership in our exclusive circles except on terms he cannot meet and live with when applied to his type and segment of the business. So he goes along without us, taking with him over one-third of our total industry volume. And he uses our own agreement as his sales ammunition to convince our public that he is right in resisting organized labor and union-shop operations. We put into his hand the competitive advantage—the club with which he beats us—and the pay-off is that in the majority this non-union operator would rather be a union-recognized contractor, once we get underneath his self-made shield of antagonism and retaliation that we have forced him to create.

We have followed our present course with diminishing effect for many years. Maybe we should try a new approach.

Public power politicians are deliberately trying to twist the granting of rapid amortization certificates into a tax "giveaway" to electric companies. Nothing could be further from the truth . . .

These Are The Facts!

T. E. Roach
President
Idaho Power Co.

Public power proponents have embarked on a malicious propaganda scheme to influence public opinion by referring to rapid amortization certificates as a "write-off" of taxes.

One phase of this attack, against my company's Brownlee and Oxbow projects on the Snake River, has been a deliberate, planned campaign to discredit Idaho Power in the minds of its customers, the very people who benefit most from any operating economy the company may properly make under the law. The expression "write-off" is a deliberate distortion because there is not a single dime of taxes written off.

Legitimate Deduction

What public power proponents are talking about is depreciation deducted for income tax purposes which every accountant, every businessman, every farmer and every owner of property used for rental purposes knows is a long-established and standard provision of the income tax law. Certainly no individual or company deducting depreciation on property for income tax purposes considers that procedure a write-off or forgiveness of taxes, as these public power people would have the public believe.

Failure of the Idaho Power Co. to use tax deductions permitted it by law would be as poor judgment as the failure of any individual taxpayer to claim the legitimate deductions allowed him on his own income tax return. Idaho Power Co. at no time has sought or received special tax consideration of any kind not available to all qualified taxpayers. All the company has ever sought is fair and equitable treatment under the law so its customers would not be discriminated against.

This Is the Law

Sections 167 and 168 of the Internal Revenue Code accord to taxpayers the privilege of choosing any one of four formulas for calculating depreciation for particular parts of their property. These are classified as straight line, sum-of-the-years' digits, declining balance and accelerated amortization. The taxpayer may voluntarily use any one of the first three methods.

As a condition to the utilization of the fourth method, accelerated amortization, the law requires that the taxpayer have a certificate from the Office of Defense Mobilization certifying that the property in question conforms to certain requirements relating to construction goals established by the ODM for industries contributing to defense needs and particularly to taxpayers who are constructing facilities important to defense in advance of and in excess of their own needs, so that this excess capacity will be available in the event of an emergency.

Power for Defense

The completion of the construction of the Brownlee and Oxbow projects by Idaho Power Co. in 1958 will provide an excess capacity beyond its immediate needs of 464,000 kw. This surplus capacity, which conforms to the criteria of the ODM, will be available to the many defense industries in the Pacific Northwest, particularly to power-short Oregon and Washington.

The Office of Defense Mobilization has determined that Idaho Power's Brownlee and Oxbow projects are qualified for certification under defense regulations and the laws established by Congress in exactly the same way as recipients of approximately 22,000 other certificates granted to taxpayers since November 1950, including 927 to electric utilities throughout the United States.

Customers Benefit

The Idaho Public Utilities Commission has publicly stated that Idaho Power, as a regulated public utility under the laws of Idaho, is required to supply service to its customers in the most efficient and economical manner possible and that, if the company failed to take advantage of savings in cost which are legally and properly available to it under the present income tax law, it would be derelict in its duties and its responsibilities to its customers.

There Is No "Giveaway"

The ODM certificates permit the company to deduct for income tax purposes somewhat higher than normal depreciation in the first five years following the completion of the projects. After the expiration of five years the company will then owe and have to pay both its deferred taxes and its normal income taxes. Thus, not a penny of tax forgiveness is involved. Total taxes paid by the company will be exactly the same under any form of depreciation — only the payments are deferred.

As the Idaho Public Utilities Commission has stated: "The benefit to

the company arises from interest savings in the financing of the projects and will inure to the direct benefit of power users as a result of lower costs in providing service."

Taxpayers Benefit

The regulations of the Idaho PUC require that any temporary tax deferrals resulting from the utilization of the ODM certificates shall be set aside in a special reserve earmarked for future taxes and cannot be used for the payment of dividends. It is clear, therefore, that the company, as a regulated public utility, is obligated under the law to utilize the most advantageous provisions of the Internal Revenue Code and, furthermore, that any resulting savings must benefit customers of the company, who are entitled to the same nondiscriminatory treatment as the customers of any other utility company.

If the company had not undertaken the Brownlee and Oxbow projects, it would not have owed and the government would not have received any taxes at all on these developments. In that sense, the loss that the public power people complain about would be entirely hypothetical because there wouldn't be any taxes to defer. Suppose that, instead, the government were now building a dam at Hells Canyon. In that event the taxpayers would be saddled with the entire cost. Furthermore, there would be no tax revenues because as a public project a dam at Hells Canyon would enjoy complete tax immunity and the taxpayers would be taking a beating both coming and going.

It is a twisted line of reasoning which objects to equitable treatment for projects that will pay about $10,000,000 in federal, state and local taxes each year and simultaneously advocates a substitute project that would not only cost the taxpayers at least $400,000,000 initially but would never pay a single cent in taxes.

If Congress decides that any of the optional methods of depreciation for income tax purposes is no longer necessary, the law should be changed accordingly. Until this is done, the law should be administered without discrimination and Idaho Power, as a regulated public utility, should receive the same equitable and nondiscriminatory treatment as is accorded to every other taxpayer.

The continuous repetition of the charge of "write-off" or "giveaway" by public power advocates is a propaganda gimmick designed to mislead the public and create the false impression that investor-owned companies are obtaining some unfair advantage, which is absolutely untrue.

Stand Up and Be Counted!

"DEFAMATION by inquisition" is a new technique that is being used in Washington to harass business for the political aggrandisement of the inquisitors. It's a technique that is easy to apply because it's easy to assemble an "investigating" committee from the halls of Congress and easier still to put the victim on the defensive. Even the most innocuous questions, adroitly phrased, can require embarrassing explanations, i. e., have you stopped beating your wife?

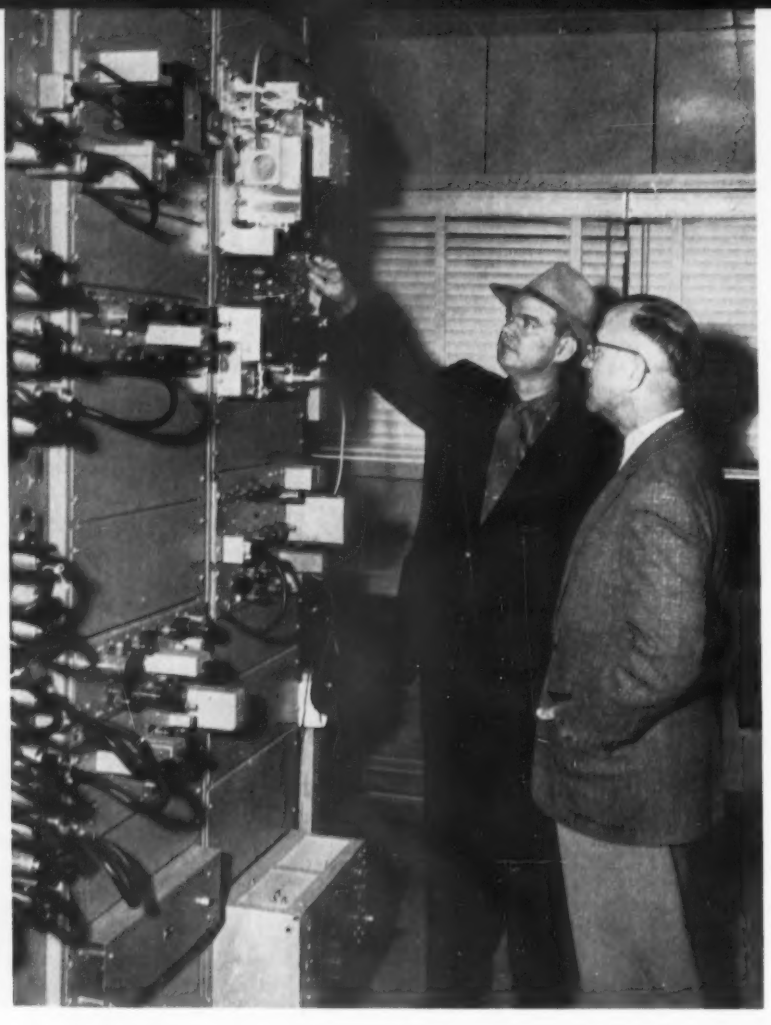
In the case of the Idaho Power Co., the attack, as Mr. Roach explains, was a deliberate attempt to distort facts to the detriment of the company's reputation and prestige.

The management of the company has rejected the ODM certificates in order that the Hells Canyon issue be unencumbered by the entirely extraneous and unwarranted controversy over the defense aspects of the Brownlee and Oxbow projects.

It is bad enough to have elected representatives in the halls of Congress who will stoop to deceit and misrepresentation. But it's worse still that businessmen as a whole and the electrical industry in particular do not rise up in indignation in defense of a principle or an unjust attack on a fine business organization.

Idaho Power was left to fight off its attackers alone. Not one single solitary voice was raised to support either the principle of rapid amortization or the legal position of the company in accepting an approved method of helping the defense effort at not one cent cost to the people.

The business community of this country is asking for more of the type of treatment just given to Idaho Power as long as it permits this type of congressional inquisition on any one member to go unchallenged. Whatever it is; fear, indifference, preoccupation, lack of leadership or erosion of the moral principles that made this country great, the fact remains that business people, individually and collectively, are turning their backs on too many battles that need to be won to prevent this country from being legislated into socialism. It's everybody's battle and everybody should assume the posture of militant defense when a friend and ally is subjected to unjust political attack. The next time this form of political blackmailing is tried, it is hoped that at least a few believers in free enterprise and the democratic system will stand up and be counted.—The Editor.



Co-author Clarence McKee and Chief Engineer Walter Dolde discuss the microwave equipment that will form the backbone for their system communications — as well as relaying

Walter Dolde, chief electrical engineer of the Public Service Co. of New Mexico, sums it up as follows:

"The availability of 25 voice channels, which can be submultiplexed to provide additional channels, offers almost unlimited uses for this relatively new tool. We have great faith in the future of microwave and we feel it is the right equipment to meet the increasing needs for channels for relaying, telemetering, supervisory control and voice communication."

Agreed that microwave was the best communication system, PS of New Mexico engineers challenged . . .

Will It Relay — Reliably?

C. G. McKee
Senior Relay and Communication Engineer
Public Service Co. of New Mexico

W. E. Sutter
District Sales Manager, General Electric Co.
Redwood City, Calif.

The undiminished growth of the Public Service Co. of New Mexico's system has demonstrated to the company's engineering management the necessity of building today for tomorrow's loads. Tomorrow is too soon.

Presently under construction is a single generator equal to the company's system peak in 1950, an average growth of 12% per year.

To match the generating requirements with adequate transmission facilities, the company's 46-kv subtransmission system in the Albuquerque area is being bolstered by the addition of a 115-kv transmission system. One section of the 115-kv system forms an important tie between two of the company's generating stations and power pool members by means of a three-terminal circuit (see diagram).

System communications have in the past been carried on by VHF radio systems, leased and private-wire circuits as well as carrier channels. These systems have been most adequate for today's system. Looking forward, the company could see a need for telemetering to a centralized dispatch center, for system-wide supervisory control, for a proposed automatic load control, for control of VHF base radio stations and for additional voice channels. Studying an immediate need for transfer trip and directional comparison relaying on the 115-kv system, the possibility of channel interference became apparent, but most important was the *inability of carrier to perform the ultimate job*. Sooner or later microwave would have to come.

With its full capacity of 25 voice channels (which could be submultiplexed), it appeared that microwave would most economically serve the present and future channel needs.

The initial microwave installation consists of four stations located in the Albuquerque area. Present plans call for the extension of the microwave system in the near future to the Santa Fe division via the Sandia station (see diagram). The particu-

lar physical arrangement shown is due to terrain and man-made obstacles, which require the crisscrossing of the RF paths in order to obtain clear line of sight between the stations. Basically, the system consists of two terminal RF and multiplexing stations (Prager and Sandia) and two intermediate RF and multiplexing stations (Person and West Mesa).

While all the power utilities employing microwave have used it for voice communication and a majority for supervisory and telemetering, only a handful have entrusted relaying circuits to this new medium. Therefore, the philosophy of this operation will be discussed since all power utilities will, no doubt, eventually utilize this form of communication.

Of particular interest is the protection of the three-terminal 115-kv transmission circuit with an autotransformer included by means of a transfer trip and a directional comparison relay scheme, and the protection of the company's system by means of a backup transfer trip relay scheme that functions to trip the West Mesa tie of the neighboring utility in case its primary relaying system fails.

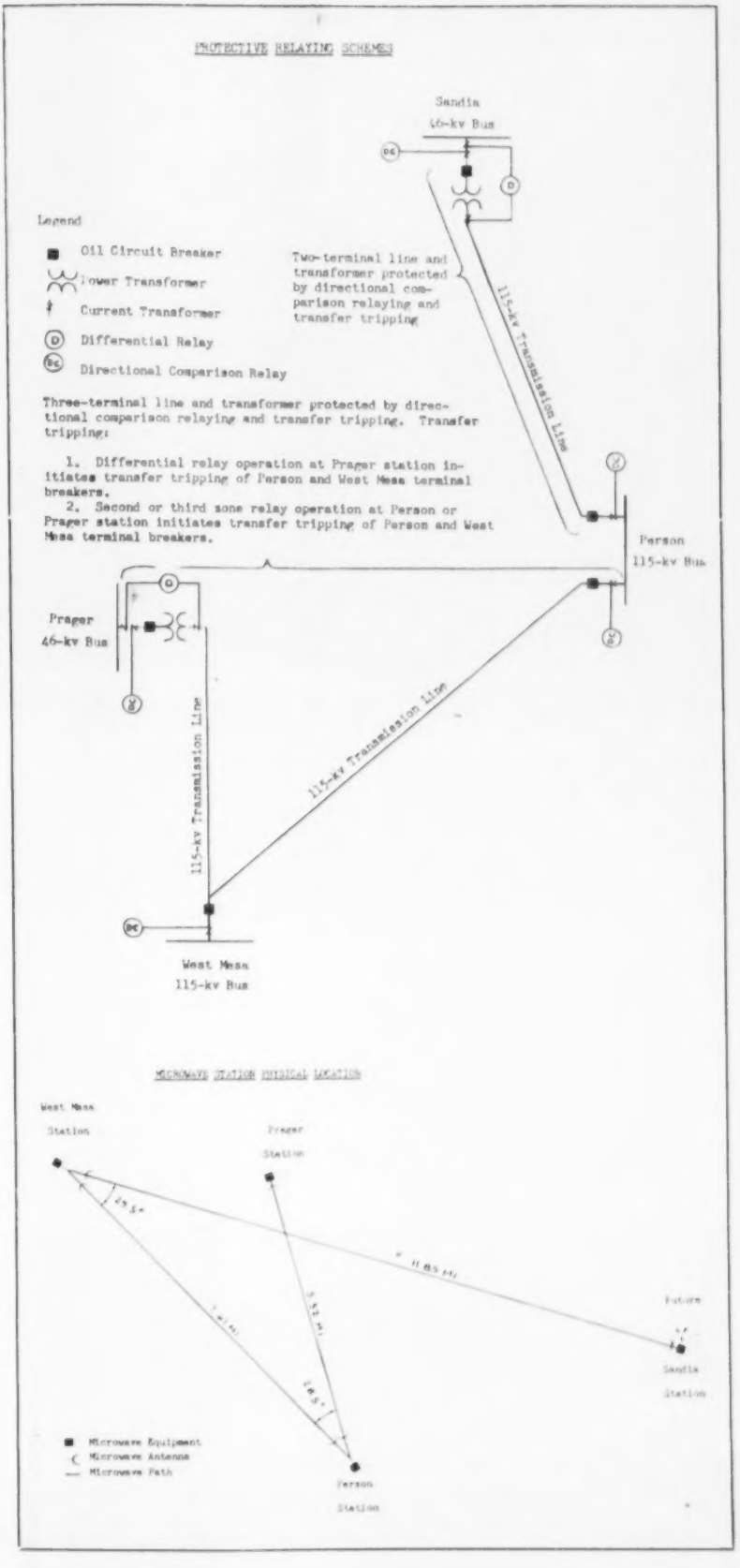
Relaying Criteria

Any pilot relaying system must provide two equally important functions: (1) simultaneous high-speed tripping of all terminals of a faulted line section; and (2) prevent tripping of the unfaulted line sections. This implies that the over-all relaying scheme should have a high degree of *reliability to trip* the faulted line sections quickly. Furthermore, it also implies that the over-all relaying scheme should have a high degree of *security against false tripping* of unfaulted line sections, both during system disturbances and under normal system conditions.

Because of the operational characteristics of this system, directional comparison relaying was chosen to protect the line.

When a fault occurs *external* to the protected line section, the terminal closest to the fault sends a continuous *blocking* signal to the other terminals to indicate an external fault and prevent useless tripping of the breakers at the terminals. For internal faults on protected line sections the tripping relays at each terminal will also see the fault and immediately stop the transmission of a blocking signal so as to allow tripping of the breakers.

It should be apparent from the brief description of this scheme that



Building top mounting helps keep down costs. Big advantage is 25 channels or more

the communication channel between line terminals is used only as a passive element; that is, it can prevent tripping but is not required to initiate tripping. Furthermore, it should be apparent that under normal (nonfault) conditions, no signal need be sent between terminals and the channel can stand idle.

On this system, using General Electric Time Division equipment, in the *off*-blocking position, the microwave relay channel transmits a continuous monitor of the channel. Tripping is permitted in this condition. When the relay equipment desires to transmit a "blocking signal" to a distant station, the channel pulse is dropped or omitted and the distant terminal is prevented from tripping. The speed of channel transmission is in the order of 1½ milliseconds or less than .2 cycle.

In the blocking-type channel, reliability is good because the channel is *not* required to permit tripping. Security of this scheme is very good for external faults, because failure of the channel produces blocking. This is important when the microwave equipment provides pilot protection for a number of lines. Even for internal faults, failure of the channel will, at most, cause delayed tripping by the backup relays. Loss of the channel cannot trip

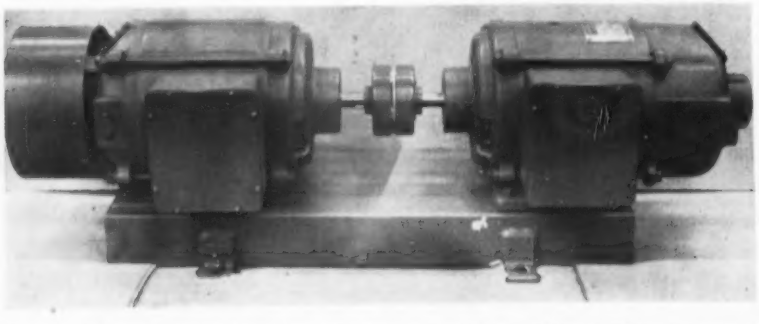
While the problems associated with relaying three-terminal lines can be numerous and can have varying degrees of complexity, in some instances the solution to these problems is relatively simple and only a minimum amount of equipment is required to provide high-speed protection of the line. In other instances, there will be no simple solution and it will be necessary to use a combination of blocking and tripping schemes plus other auxiliary relays to achieve high-speed tripping. However, in this particular case the solution was a blocking scheme, which required essentially no change in the microwave channel operation from the method used for two-terminal operation.

For the transfer trip function, a slightly different method is employed because the reliability and security requirements are different since this is a *tripping* scheme rather than a *blocking* scheme. The transferred-trip signal will directly trip the local breaker even though the local relay does not see the fault.

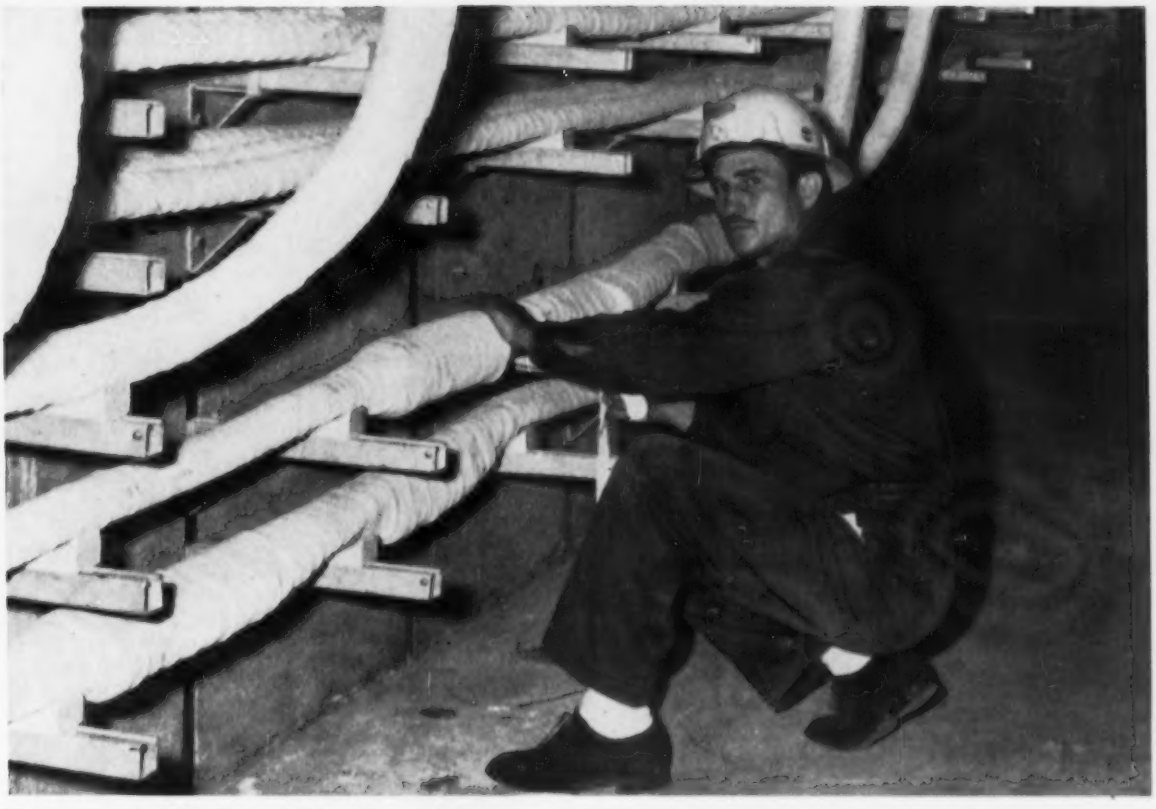
Each transfer-trip channel normally transmits a monitoring or guard frequency that energizes a guard receiver relay. By shifting the frequency of the tone from the monitor frequency to a trip frequency, the signal for tripping is transmitted to the distant stations and the guard relay drops out and the trip relay picks up. In this case a failure of a system component which results in the interruption of the monitoring signal will not cause a false trip because of the loss of the incoming channel.

Emergency Power Supply

Since the a-c power for the microwave communication equipment is normally obtained from the same lines that the relay channels are protecting, it is necessary to provide a means of supplying power from an external source to the entire system during these faults. Since present designs of microwave equipment prevent direct operation from station batteries, an intermediate continuous power supply must be installed. At Public Service Co. of New Mexico each station is equipped with a General Electric d-c to a-c conversion unit. Ordinarily, power is taken directly from the a-c lines, rectified and used to drive a d-c motor, which in turn drives an a-c alternator to supply power to the microwave equipment. Upon failure of the incoming a-c, the control panel switches the d-c motor automatically to station battery and the power to the microwave equipment is continuous. Upon restoration of the a-c line, the control panel automatically switches back to normal operation.



Power reliability is achieved by drawing on station battery during emergencies



Rack-supported cables in a tunnel under a substation are easy to inspect or repair with a minimum of time and expense

Application principles and economics of

Substation Control Cables

E. C. Neff
Cable Supervisor, Substation Division
Southern California Edison Co.

The complexity of modern relaying and control found in generating stations and substations has made it vitally necessary that control cables be as free from trouble as human ingenuity can devise. Failure of a single control wire may result in an outage as devastating as that caused by failure of a major system component.

For many years rubber-insulated, lead-covered wires were used as control cables; however, troubles developed that made this type of cable unreliable.

The greatest trouble came from the rubber insulation at the end of the cables being exposed to air. This caused the insulation to deteriorate progressively from the end down the cable. Failures of this type have been found where 30 ft at each end of a 500-ft run were defective.

A lead-covered cable job is often limited by the skill of the installer. Many so-called cable failures can be traced to damage caused during installation.

These troubles motivated research and study by manufacturers and resulted in today's rubberlike sheathed cables. These synthetics have come into almost universal use as control cables in modern stations.

This new type control cable is also subject to failure if proper care is not taken in designing the installation and careful handling when laying the cables.

Throughout the years much know-how has been gained in the methods of splicing various types of cables.

Two principles have evolved:

1. Train and use experienced men.

A Selected PCEA Paper

2. Follow the manufacturer's instructions.

There are available different types of universal splicing kits that provide all the necessary material for splicing control cables. These kits allow the use of average labor in place of skilled workmen.

A study of comparative costs shows that a well-qualified workman can make a much more reliable splicing job, using standard material specified by the manufacturer, at a much lower production cost per splice than a comparative splice made using one of the splicing kits.

Methods of Installation

There are four common methods of installing control cables. They are duct lines, cable trenches, cable tunnels and open metallic trough, each of which has value in a given installation.

Considerable weight must be

Above, manufacturer's recommended splice is neat, rugged and low cost, but takes skilled workman to perform. Kit splice, below, takes less skill but costs more

Cost Comparison of Splicing Methods

Cost with Cable Manufacturer's Recommended Splice

1 roll rubber compound tape	$ .88
1 roll friction tape	.72
1 roll neoprene tape	.83
18 No. 10 Hydent connectors at 10c each	1.80
Labor (one man-day)	28.00
	$32.23

Cost With Splicing Kit

1 roll rubber compound tape	$ .88
1 roll friction tape	.72
18 No. 10 Hydent connectors at 10c each	1.80
3 plastic sleeves	21.00
Labor (one man-day)	28.00
	$52.40

given to the ability to perform maintenance at a minimim cost of labor and material, as the replacement cost of a section of cable may outweigh all of the apparent lower first cost of installation and delay the return of service of a very vital piece of equipment.

1. **Duct Banks**—The use of ducts offers the advantage of low cost on a small installation, where the ultimate design requirements can be fixed. It is necessary to install all the required ducts, even though more than 50% of the ducts may not be used for a number of years and the installation thus not earning a return on its initial cost. The carrying charges on such an installation may outweigh the apparent economy over other methods.

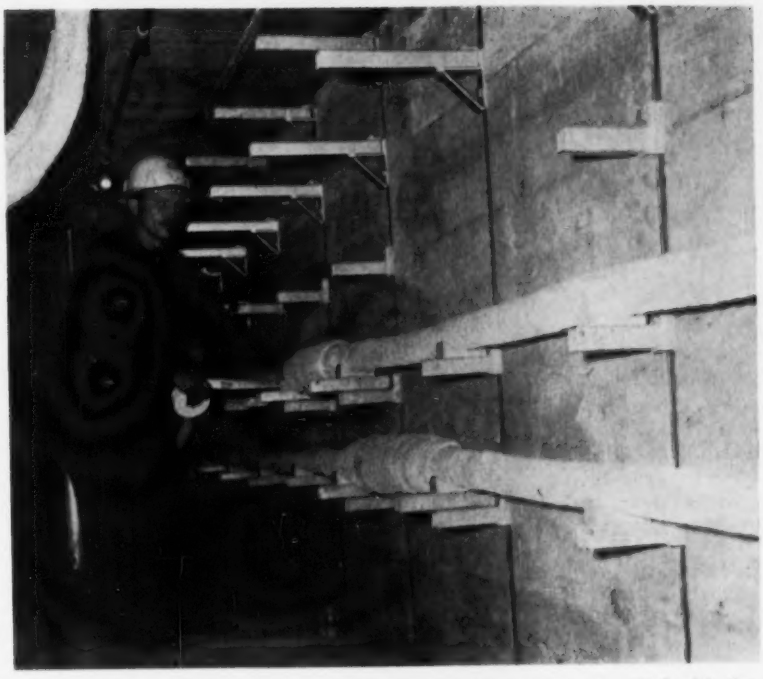
2. **Cable Trenches**—Cable trenches offer a very flexible and economical method of installing control cables in medium-size stations. The trenches must be well designed for the protection of the cables and the cables carefully installed.

The problems of pulling a small group of cables through a duct are eliminated and cables may be laid directly in the trench with a minimum of possibility of damage. Sections of cables may be replaced without having to pull out a group of cables as in a duct. With all work in the open, there are savings in man-hours of labor and outages on other positions.

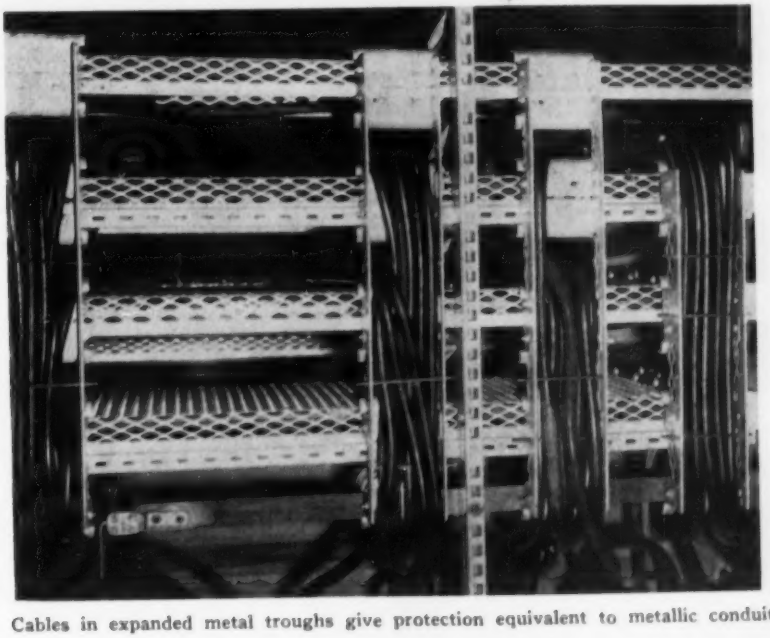
Cable trenches are subject to the collection of foreign objects such as gravel, which can damage any cable sheath and thus shorten its life. To avoid the damage to cables caused by rocks, etc., cables may be installed on racks at a small additional cost, thus keeping them away from such foreign objects.

3. **Cable Tunnels**—For large stations, where a great number of control cables must be installed in several stages, the most flexible and efficient method is the construction of a cable tunnel with the cables carried on racks or expanded metal trough. The added initial cost for the tunnel is offset by the decreased labor cost of installing cables, as they may be placed individually or in groups by conveyor methods as against the higher labor cost of pulling groups of cables through duct banks or trenches.

Additional cables may be installed progressively at a minimum of cost and with no disturbance to existing cables. Inspection is easy as every cable may be clearly seen for its full length and any damage is readily visible.



Spare racks in cable tunnel make expansion easy, inexpensive compared with ducts



Cables in expanded metal troughs give protection equivalent to metallic conduit

There are two general methods of supporting cables in a tunnel or trench, namely, racks or open metal trough. Each method has its own advantage. Racks take less space but troughs offer a complete support and provide faster installation of cables. Maintenance cost of these types of installations is very low in comparison to other methods.

4. **Open Metal Trough** – In locations where there is a very heavy concentration of control cables, such as in a basement under a control room of a major substation or generating station, or in the case of control distribution for plant facilities at generating stations, an open expanded metal trough installation offers many advantages. Control cables may be installed for additions, inspected or replaced with ease, as each cable may be traced from the incoming duct or tunnel to its termination at the control point.

This type of installation eliminates the maze of conduit work that was formerly used to carry the large number of cables required for a control board and allows the use of space near walls or ceiling that otherwise would be vacant.

The modern type of expanded metallic trough when considered as a raceway has electrical continuity adequate to activate ground protective devices on ground fault, which provides protection equivalent to metallic conduit.

In addition, cables may be sized on the basis of "free air" rating as against the reduced rating specified when a number of cables are installed in a conduit, which allows the use of smaller cables for the same loading.

Comparative Estimate of Cost of a Cable Duct Bank Vs a Cable Tunnel
(Per 100 ft)

Duct 40 ducts—100-ft run		Tunnel 6x6½x100-ft	
Labor	$ 635	Labor	$ 552
Exc. and backfill	250	Exc. equipment	250
Concrete	1,120	Concrete	1,346
Duct	920	Re. steel	120
Spacers	75	Pierce racks	205
		Pierce hooks	200
	$3,000		$2,673

Cable trench as used for small station

FIRST drive a special piling from foundation level to bedrock. This waterproof curtain saves excavating more than 90 ft

THIS GIVES a water curtain extending 300 ft across the valley floor. Cross section of the piling is 15x18-in. rectangles, which will be filled with concrete. Time dictated this approach rather than excavation and impervious filling to bedrock

A Short Course in Dam Building

A picture story of PP&L's Swift development

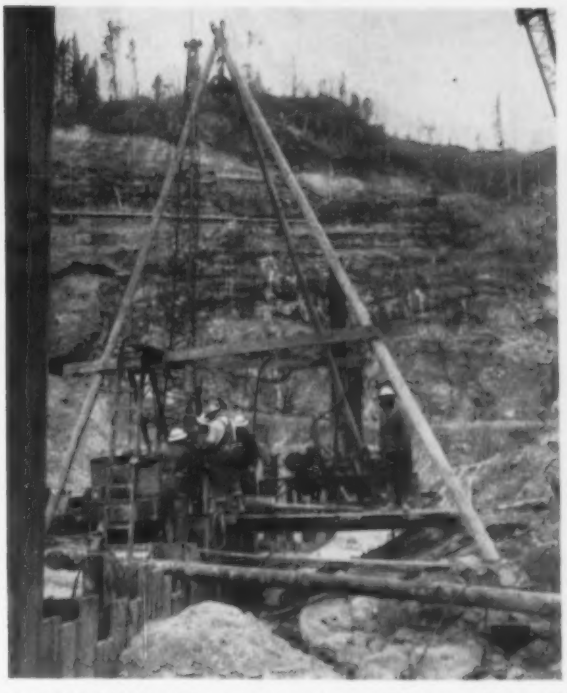
If Pacific Power & Light Co.'s dam builders had to dig down to bedrock at their Swift hydroelectric site, they would have to remove 200 ft of porous earthfill from the floor of the valley. That costs money! Once at bedrock, they would tie an impervious core to the rock floor and then build this impervious inner dam up to the old stream-bed level. Then they would proceed with construction until the dam was 510 ft high—the world's highest earthfill dam.

Necessity became the mother of invention. After engineering and economic studies, it was decided to excavate an open cut 100 ft beneath stream-bed level. Then H-section, fabricated and interlocked, piling was driven to bedrock. The dirt in the 15x18-in. cells made by the beams was pumped out. Then a drill rig bored 5 ft into the bedrock and the cells were filled with grout, consolidating the piling with the bottom of the canyon.

MORE THAN 15,300,000 yd of earth will be moved in the two seasons. This picture is one of the last taken of the Swift project. This shows progress to the 15th of July

ENTER THE EARTHMOVERS and the concrete wall begins to vanish beneath the growing mountain of dirt. As the pace quickens 40,000 yd of earth will be placed per day

THE COMPLETED CURTAIN is shown after the cells are pumped clean and a drill has bored into rock. At the far end of the valley forms are taking shape over completed curtain



A DRILLING RIG probed the bottom of each piling cell, drilling five feet into rock to make certain that the piling was resting on bedrock. Grouting completed the operation

Second phase of the new technique was the erection of a 30-ft concrete wedge-shaped wall atop the piling. Extending into the core of the main dam structure, the wall was designed to further increase resistance to any possible seepage.

Placement of fill material for the dam structure began while the wall was still under construction, earth-moving equipment maneuvering through gaps left purposely for this use and built up in steps as the filling operation proceeded.

By mid-June the wall was under 50-60 ft of fill, 10% of the 15,300,000 cu yd of fill the dam will require. By midsummer the contractor expects to be moving 40,000 cu yd a day.

PP&L's chief engineer, E. Robert de Luccia, directs the project with Bechtel Corp., San Francisco, in charge of design and supervision of construction.

Completion of construction and initial power delivery is scheduled for late 1958. The dam, 2,100 ft long at its crest and 1,950 ft thick at its base, will impound 740,000 acre-ft of water in a 13½-mile-long reservoir.

The dam's power house will have three turbine-generators rated at a total of 204,000 kw and with maximum capability of about 250,000 kw.

THE GAPS IN THE WALL allow the trucks and tractors to begin the filling operation. The taper shape enables the fill to be tightly compacted against the concrete barrier

FOR EXTRA PROTECTION against seepage, construct a 30-ft wedge-shaped wall on top of the piling. 56,000 yd of concrete were required to build this dam within a dam

Desolation at top of photo is scene of remarkable water study

From desolate sand dunes comes . . .

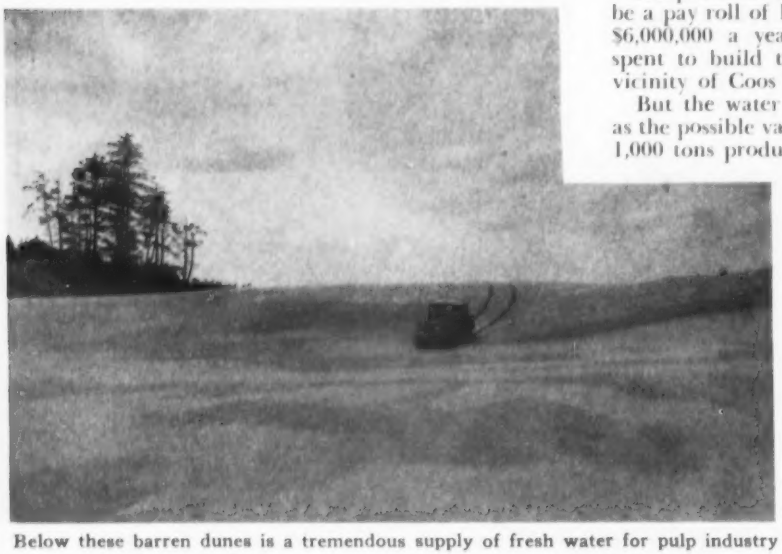
Water for Building Load

When Mountain States Power Co. was merged with Pacific Power & Light in 1954, PP&L looked over some of the new service area and found a potential 1,000-ton-a-day pulp-paper industry—if the water could be found for the processing.

If a potential of this size were developed, there would be a pay roll of 1,300 men drawing down an estimated $6,000,000 a year, and about $80,000,000 would be spent to build the industry. The potential is in the vicinity of Coos Bay and North Bend, Ore.

But the water supply required is just as impressive as the possible value to the area when you consider that 1,000 tons production could require up to 100,000,000 gal daily. The area receives an average annual rainfall of 65 in., but only 5-in. total falls during five summer and autumn months, so a firm water supply is necessary. Reservoirs are too costly and also inadequate for the amount of water needed for a major expansion of the pulp-paper industry. A new source of water had to be located.

In the summer of 1955, PP&L drilled deep wells at several points without tapping satisfactory supplies. About this time, the U.S. Geological Survey concluded an examination of the sand dunes area north of Coos Bay. The USGS survey did



Below these barren dunes is a tremendous supply of fresh water for pulp industry

At left, Davenport measures water level in vertical pipe, and Carl Starr, above, does the same in routine water-level check

Dutch Engineer Cornelis Biemond checks surface water. Jordon Lake pumping station water is measured in a V-notch weir

not reveal an adequate water supply, but some evidence in preliminary reports attracted the attention of PP&L engineers and they decided the area deserved more exploration.

The Results

C. P. Davenport, PP&L's Coos Bay water project engineer, sums up the success of the 16 months of investigation that have followed in a rather cautious tone. He says: "The results of our investigation to date all have been affirmative." He means that the company feels it has located a fresh water supply of at least 100,000,000 gal a day. Where the supply was found—below desolate sand dunes and below sea level—and some of the investigation methods, are illustrated on these pages.

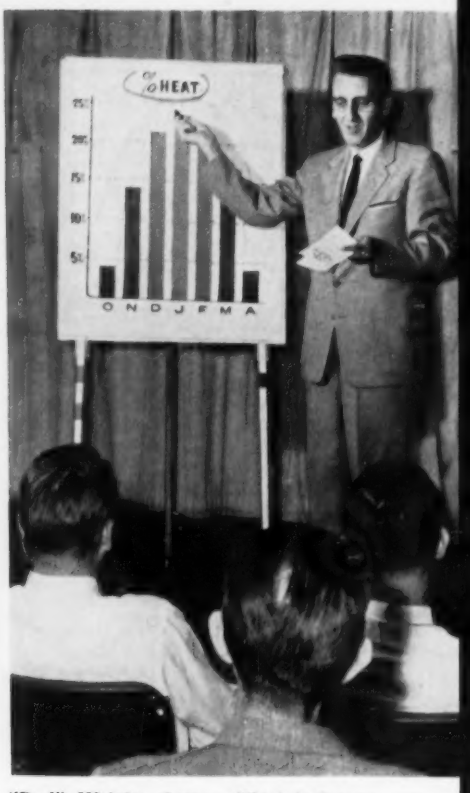
At the beginning of the search, PP&L installed 170 water-level measuring pipes at 60 key locations from Jordon Lake at the edge of the bay to Ten Mile Creek. These revealed the extent of water-bearing formations and the fluctuations of the water table under seasonal conditions. Radioactive tracers were injected into the ground water at one point to trace the direction and rate of flow of the underground water that appeared to be replenishing the supply under the dunes. Pumping at Jordon Lake and at Hauser on the east edge of the dunes was started. For further testing of water production of the immediate area, a vertical caisson was placed in the lake. Finally, 200 ft of 35-in. permeable concrete pipe were laid in a trench and covered, and this collector system fed into a vertical well from which pumping has been under way since last November.

Consulting on the project is Cornelis Biemond, director of Amsterdam, Holland, water works, and expert on this type of water source.

Permeable concrete pipe on way into canal to form gallery-type collector system

Diver prepares to release timbers from the permeable concrete pipe in the canal

Washington Water Power's electric heat promotion has brought more than 500 installations on the utility's lines since Jan. 1. Kimball I. Jack, vice-president (left), and Gordon DeFoe, general sales supervisor, are heading up this activity



"Bud" Wright shows allied industry group that more than 50% of annual heating costs occur between December and February

WWP'S experience proves that

Electric Heat Is Competitive

AS the first major utility in the Pacific Northwest to promote electric heat actively, the Washington Water Power Co. reached the mid-point in June of its intensive 12-month campaign with an encouraging record of more than 160 commercial installations and 367 residential jobs for a total primary connected load of approximately 5,092 kw.

"Water Power's decision to actively promote electric heat was announced in January, after the results of a two-year survey of 50 electrically heated homes in our Spokane headquarters area proved that, when properly engineered and installed, electric heat could compete on a cost as well as a convenience basis with any other fuel," WWP Vice-president Kimball I. Jack reports.

"Traditional formulas for the computation of heating efficiency were upset considerably when actual experience factors proved an effective replacement for the engineer's slide rule," Jack said. "In an area where winter temperatures frequently reach 10 to 15° below zero, our survey indicated that the average cost of heating a well-insulated 1,000-sq-ft home was 16.5c per square foot."

In addition to an advertising and sales campaign aimed at the consumer public, WWP launched a series of educational meetings especially prepared for electrical contractors, builders, architects, engineers and dealers throughout the company's 30,000-square-mile service area. The format of each of these meetings was carefully tailored to spell out convincingly the advantages of "hard selling" electric heat.

The company anticipated that with approximately 90% saturation of electric ranges and water heaters in its service area, dealers would be interested in the doors that would be opened as a result of a customer's powering up to use primary electric heating. With adequate service entrance problems automatically eliminated, new basic home appliances such as dryers, dishwashers and

other high-wattage equipment are much easier to sell.

The space-saving flexibility of electric heat, plus the advantages of room-to-room control, was stressed for builders and architects. Giving the prospective home buyer more usable room (i.e., that formerly occupied by a central heating plant) provides obvious sales advantages for the custom builders as well as the speculative or project contractor.

To provide electrical contractors with a practical guide for installing properly engineered heating equipment, WWP's sales staff developed a 12-page brochure, which the contractor can use to analyze the individual specifications of each heating job. Correctly used, this guide will result in an installation that can be approved by the utility for maximum heating efficiency.

With its 400,000-kw Noxon Rapids hydro project well under way in western Montana, WWP anticipates that adequate power supply will be available to serve the new load at an attractive cost to the electric heating customer.

"Budget billing," the preset installment financing system designed to spread out the cost of electricity during higher-use-months, is also available to any WWP residential customer on an optional basis.

From the middle of August to Oct. 1 of this year, the company plans to intensify its effort to reach the consumer public with its electric heating campaign. Testimonials selected from more than 7,000 electric heating customers on WWP lines are proving to be useful selling aids. Dealer-members of the company-coordinated Inland Empire Electrical League are enthusiastically participating with heating equipment manufacturers in a tie-in advertising campaign integrated with WWP's use of press, radio, television and billboard media. Notable firsts, such as a radiantly zone-heated bowling alley, serve as impressive examples of commercial application.

Delegates to the Northwest Electric Light & Power Assn. meetings heard WWP's general sales supervisor, Gordon DeFoe, and Harold "Bud" Wright, heating engineer, outline the significance of the company's new promotion in terms of the competitive edge it provides against natural gas, newly arrived in the Pacific Northwest.

Mass acceptance of heat pumps apparently is not on the foreseeable horizon in electric heat promotion in the Pacific Northwest.

Which Is More Accurate—Theory or Experience?

Don't rely too heavily on estimated values costwise until you give them a check in your particular area.

That would seem to be one lesson to take from Washington Water Power's two-year study to determine what people are paying for electric heat as compared with the estimate by various methods. Fifty homes were selected at random, measured, evaluated as to construction, submetered.

Estimating methods show a wide variation, depending upon whether theoretical or based on experience, it is shown in reports of Harold Wright, WWP heating engineer, at recent NELPA meetings. For example, the following shows a considerable narrowing of operating costs in experience:

Theoretical

$$F = \frac{HL\ (Ti - Ta)\ Hrs}{EFF \times TD \times C}$$

Oil $161
Elec 295

Experience

(for the same heat loss)

Oil: Unit Fuel Factor × DD × MBH = $190

(from ASHE and DD Handbook)

$$\text{Elec.}\ \frac{KW \times DD \times 18.5}{TD} = 214$$

The following shows the similarity within the various methods but not between them for a sample calculation. Methods 1 and 2 are estimates based on theory, while 3 and 4 are based on experience.

1. DD method:	kwh = 22,700	= $272	= 21.5c/sq ft
2. Av. Temp. method:	kwh = 22,400	= 296	= 23.5c/sq ft
3. NEMA:	kwh = 17,500	= 210	= 16.8c/sq ft
4. H.F.:	kwh = 17,600	= 211	= 16.9c/sq ft

"We hoped our study would give us more concrete reason to believe in our estimating, that it would help point out for us which methods were most realistic," Wright said. "I believe our results speak for themselves."

Using theoretical methods the expected cost for the group of homes was $240/yr for an average size of 1,040 sq ft, or 23c/sq ft/yr. The actual average was $169 or 16.56c/sq ft/yr. Average heat factor of these homes is approximately .24.

In addition the costs revealed that 32 out of 50, or 64%, were below the average with a few relatively bad jobs holding the average up. These results tend to give WWP confidence that it can quite safely say that a well-insulated home and a well-designed job should show costs in this vicinity.

For apartment dwellers, WWP found an even more startling result. Fifty-two apartments, averaging more than 600 sq ft, have averaged 8.6c/sq ft/yr.

Results in surveys in other areas appear to be in line with Washington Water Power's, Wright said. "It appears that electric heat is indeed competitive with other fuels and its promotion in that respect is fully justified."

What WWP expects to gain from its promotion of electric heat, in addition to customer satisfaction, is a hedge against natural gas inroads. Electric heating can be a pivotal load just as gas heating can.

And what about revenue? In WWP territory with 90+ saturation of ranges and water heaters and dryers reaching a point at which the wiring problem alone is leveling them off, new loads must be promoted. One thousand heating jobs provide the revenue of approximately 6,600 water heaters, 11,000 ranges or 2,000 dryers and they are comparatively easy to sell.

Electric resistance heating, on the other hand, has proved in thousands of installations to be formidable pivotal load, literally "growing up" without benefit of anything but public demand for the previously sold advantages of changing from fire to wire. Not only does it protect against other heating inroads, but it can help sell up in electric living. The usually ample service entrance of electric heating provides room

for other appliances and automatically removes the greatest present bottleneck to sales.

Also, utility apprehensions concerning electric heating characteristics are appearing to be less and less justified in WWP's area. Studies are showing operating costs surprisingly competitive and average annual load factors that appear to be comparable to the pattern of other high-use customers.

And what about revenues from heating? How does it compare with other sales? With high saturations in most major home appliances in its service area, WWP has to look at new loads, and anything on the horizon with the kwh magnitude of electric heat demands a critical look. One thousand heating jobs provide the revenue of approximately 6,600 water heaters, 11,000 ranges or 2,000 dryers, and are in fact comparatively easy to sell.

"But by no means least among the many rewards is the freedom of selling all-electric," said DeFoe and Wright. "Our allies have been at a loss to understand our apathy toward fuel systems in all-electric homes when their warehouses are stocked with good electric heating equipment. We go to these people for help and their support has sometimes been colored by their feelings that our cooperation is limited. The full mating with electric heating helps instill into our electric league groups a new vigor toward selling all-electric and promoting the Live Better . . . *Electrically* theme."

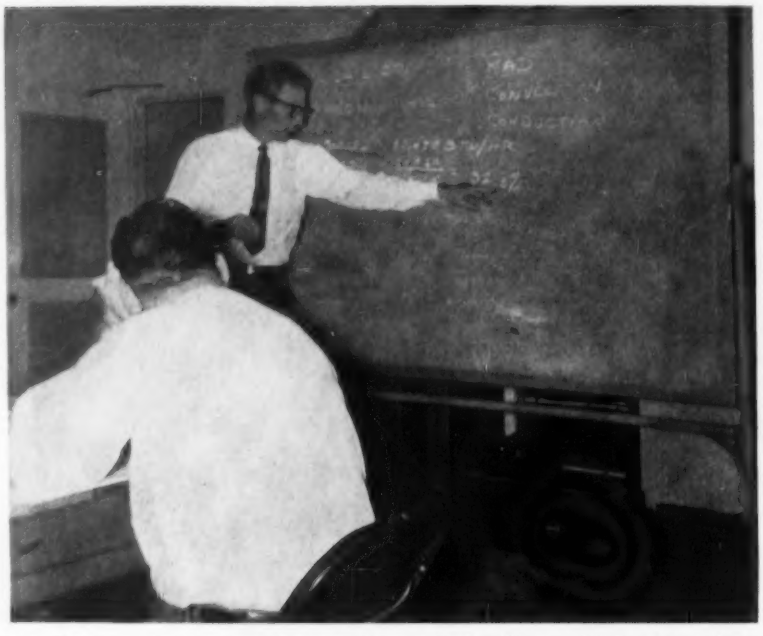
--Utah Offers a Guide

A guide to the use of electricity for house heating has been prepared by Utah Power & Light Co. and its subsidiary, Western Colorado Power, for circulation in the companies' service area.

This comprehensive 12-page booklet points to the increasing interest in electric heating and goes on to discuss two classifications—complete and auxiliary installations.

Special sections are devoted to the heat pump, glass panel heating, radiant panel heating, unit-type heaters and reverse-cycle room air conditioning.

Insulation is discussed, with its effect on heating capacity and four pages are devoted to cost factors. A table gives estimated annual cost of residential space heating for insulated houses in the Salt Lake City area.



Ted Fuller conducts a one-night session at Garberville, model for later classes

--and PG and E and Bureau Teach Contractors To Sell It

A whole series of schools throughout most divisions of Pacific Gas and Electric Co. in northern California has developed out of the successful electric heating school initiated in the Humboldt division at Eureka under the sponsorship of Northern California Electrical Bureau and aided by the adult education department of the schools. Groups of electrical contractors, their estimators, journeymen, apprentices, as well as builders, architects and appraisers for leading agencies, are taking advantage of this opportunity to learn how to estimate, engineer, install and sell electric heat.

The program has given new life to electric heating, so long neglected but again being appreciated as very desirable business for the industry.

Contractors and utility discussed the problem—the general lethargy on the part of contractors and company employees in promoting electricity as a heating source. "Too few potential users were able to find anyone locally who could or would make a layout and discuss the economics of electric heating with them," said Dan F. Villa, Humboldt division manager.

George P. Cornwell, commercial manager, with the cooperation of the general office, set about to organize a class on the economics, design and application of electric heating. A plan was developed to hold five meetings of three hours each, one night each week. The first two meetings were handled by Ted Fuller of the general office, who covered the story of heat-loss computations and adequate sizing of heaters for design conditions. The third meeting was assigned to electric heating manufacturers' representatives who were most active in that area.

Although primarily planned around residential heating, because most applications in the division are concentrated in that direction, one evening was devoted to industrial applications. This was to be a demonstration of various types of equipment available. The fifth meeting was planned as a combination social evening and discussion of the Housepower program with Walter Abraham of the general office as the speaker.

Prior arrangements were made with the manufacturers' representatives to share the cost of the dinner

RESISTANCE SPACE HEATERS

• Heater type / • Properties	CONVECTORS	RADIANT CONVECTION	FAN HEATER	RADIANT	PANEL	CONVECTION	PANEL
	WALL INSERT (Available with surface adapters)				WALL or BASEBOARD SURFACE		
CONVECTION	MED. HIGH	MED.-HIGH	HIGH-FORCED	MEDIUM	MEDIUM	MED. HIGH	MED. LOW
RADIATION	MED. LOW	MEDIUM	NONE	HIGH	MEDIUM	MED. LOW	MEDIUM
CONDUCTION	LOW	LOW	LOW	LOW	MED. LOW	LOW	MEDIUM
AIR CIRCULATION	HIGH	MEDIUM	HIGH VELOCITY	MEDIUM	LOW	MEDIUM	LOW
AIR PURIFICATION	HIGH FOR CORE TYPE	HIGH FOR CORE TYPE	NONE	LOW	NONE	NONE	NONE
NOISE LEVEL	NONE	NONE	LOW	NONE	NONE	NONE	NONE
USUAL APPLICATION	BED RM. LIVING RM.	BED RM. BATH LIVING RM.	REC RM. KITCH. LIVING RM.	BATH ROOM ONLY	BED RM. BATH LIVING RM.	LIVING RM. BED RM.	LIVING RM. BED RM.
LOCATION	WALL	WALL	WALL	WALL	WALL	UNDER WINDOWS	UNDER WINDOWS
FURNITURE PLACEMENT	MINOR LIMITATIONS	LIMITED	MINOR LIMITATIONS	LIMITED	LIMITED	MINOR LIMITATIONS	LIMITED

• Heater type / • Properties	CONVECTORS	PERIMETER	CABLE	FORCED AIR	CABLE	PANEL	LAMP
	FLOOR INSERT			CEILING INSERT		CEILING SURFACE	
CONVECTION	HIGH	HIGH	LOW	HIGH	NONE	NONE	LOW
RADIATION	NONE	NONE	HIGH	NONE	HIGH	HIGH	HIGH
CONDUCTION	LOW	LOW	MEDIUM	LOW	MEDIUM	MEDIUM	LOW
AIR CIRCULATION	HIGH	HIGH	LOW	MEDIUM	NONE	NONE	LOW
AIR PURIFICATION	MED. LOW	NONE	NONE	NONE	NONE	NONE	NONE
NOISE LEVEL	NONE	NONE	NONE	MEDIUM	NONE	NONE	NONE
USUAL APPLICATION	LIVING RM.	LIVING RM. BED RM.	LIVING RM. BED RM.	BATH	LIVING RM. KIT. BED RM.	LIVING RM. KIT. BED RM.	BATH ONLY
LOCATION	FLOOR-AVOID TRAFFIC	FLOOR-NEAR WINDOW	FLOOR	CEILING	CEILING	CEILING	CEILING FIXTURE
FURNITURE PLACEMENT	LIMITED	MINOR LIMITS	SMALL LIMITATION	NO LIMITATIONS	NO LIMITATIONS	NO LIMITATIONS	MINOR LIMITS

• Heater type / • Properties	CONVECTION	FAN	RADIANT	PANEL	SUSPENDED FAN	BRACKET	DUCT HEATER	UNIT VENTILATOR
	PORTABLE HEATERS				COMMERCIAL TYPES			
CONVECTION	MED. HIGH	HIGH FORCED	LOW	MEDIUM	HIGH-FORCED	MED. HIGH	HIGH-FORCED	HIGH-FORCED
RADIATION	MEDIUM	NONE	HIGH	MED. HIGH	NONE	MEDIUM	NONE	NONE
CONDUCTION	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
AIR CIRCULATION	HIGH	HIGH VELOCITY	LOW	LOW	MED. HIGH	MEDIUM	MED. HIGH	HIGH
AIR PURIFICATION	HIGH FOR CORE TYPE	NONE	LOW	NONE	NONE	LOW	MEDIUM-FILTERS	MEDIUM-FILTERS
NOISE LEVEL	NONE	LOW	NONE	NONE	MEDIUM	NONE	LOW BLOWER SYSTEM	LOW
USUAL APPLICATION	ADDED ROOM-OFFICE	ADDED ROOM-OFFICE	PATIO-SPOT	SPOT	FACTORY/WAREHOUSE	OFFICE	W/AIR CONDITIONING	SCHOOL-OFFICES
LOCATION	FLOOR	FLOOR	DIRECTED	DIRECTED	HORIZONTAL-HIGH	OUTSIDE WALL	NEAR EACH O REGISTER	OUTSIDE WALL
FURNITURE PLACEMENT	MINOR LIMIT	NONE	LIMITED	MINOR LIMIT	NO LIMIT	MINOR LIMITS	NO LIMIT	NONE

This chart was prepared by the bureau to show the different types of resistance space heaters, with the properties of each

on the final evening. This dinner encouraged full attendance at the other meetings.

The director of adult education agreed to cooperate in sponsoring and providing classroom space. A fee of $10 was assessed the electrical contractors to insure interest and attendance. The fee covered as many of the contractor's employees as desired to attend. There was no fee for individuals, such as appraisers, architects or building contractors. Some 20 apprentices attended all the classes. Provision was made to release them from one of their night classes and give them credit for attending the electric heating course.

Although a letter was sent to all contractors, sign-up from the mailed announcement was small and personalized follow-up was made to all contractors in the area. As a result, the first meeting had 60 attending and 54 completed the course. To receive a certificate they must attend all but one of the meetings.

The third session with the manufacturers' representatives was unique. It divided the class into six groups of 8 to 10 individuals and each manufacturer had 25 minutes to discuss his own products with each group. The groups were rotated in an orderly manner, at a given signal, and this change of room and speaker kept the class and speakers alert. With such a small group, questions came more easily and answers were given to the problems raised. The opportunity for electrical contractors to compare both the product and the people presenting it was worth-while to the contractor. It also gave the manufacturer's representative a chance to tell his story

Manufacturers' representatives participated in industrial heating meetings. Here Stanley Blois of PG and E's general office demonstrates applications and equipment to an interested group

to contractors in an atmosphere more favorable than the contractor's shop with its distractions.

The industrial applications session was very well received. As a result, the subject will be included in all of the subsequent classes. Many small-area contractors had an opportunity for the first time to learn of industrial applications that they could sell to local consumers.

Certificates of completion on a billfold-size card were presented by the Northern California Electrical Bureau. These were mailed to the contractor to give to his employees attending. Names of contractors who cooperated in the course and received the certificates were listed with the counter employees of the power company. All inquiries received at the counter are to be directed to one of these contractors. A check of the prospects sent to contractors will likewise be kept to insure follow-up and cooperation.

Industrial Sessions

Stanley Blois of the general office presented the industrial heating meeting. Manufacturers' representatives who participated were M. A. Stensen, Electromode, Joel Ingebritson, Berko, Dennis O'Leary and Dick Reed of Montgomery Bros. (Chromolox), Kenneth F. Brooks and Donald Elder of Norris-Thermador, V. A. Labarthe, Westinghouse, and Art Banchero of Wesix. J. M. Stearns of the Humboldt division coordinated the activities of the school.

Immediately following the Eureka course, a second was held at Ukiah. However, it was condensed to a three-night program and 23 were in attendance. Further condensation was made for a single-night meeting at Garberville. This started at 4 p.m. and continued until 10 p.m. with dinner served right in the meeting room, in order to save time. This proved so effective in a concentrated session that the series of meetings in some 15 other parts of northern California will be patterned on the Garberville meeting. It was felt that, if any further five-class sessions are presented, the first two meetings will have the data and computations during both meetings, with discussion of the types of equipment available also interspersed. In this way class members will be enabled to digest the more complex procedure somewhat more slowly.

As aids in the instruction, PG and E prepared comparative operating costs of heating electrically and with LP gas.

- - - while Oregon-Columbia NECA

Runs Its Own Heat Drive

FACING the fact that, if electrical contractors are to get the electric heat business that is potentially available, they must gird themselves to sell it and sell it intelligently, the National Electrical Contractors Assn.'s Oregon-Columbia Chapter tried out a "pilot" campaign in central Oregon this spring. It proved many things.

Among them were:

1. Cooperation instead of competition will sell more heaters.

2. Contractors need more basic technical data on electric heat and insulation.

3. This should be prepared for them in simple, easily understandable layman's language that they can use to sell the idea to their public.

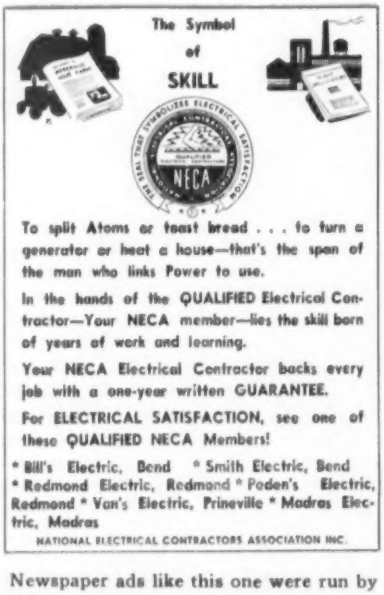
4. Such data need to be unscrambled from various manufacturers' product claims and competitive propaganda.

Follows Policy Meetings

This electric heat promotion came about as a consequence of policy meetings with representatives of electric heating equipment manufacturers. In an effort to correct some of the bad policies of direct sales, misleading claims and advertising, inadequate installations and service trouble, NECA met with the makers of heating equipment. Reason for by-passing contractors was that they did not sell or know how to sell electric heat, the manufacturers declared. They were developing their market as best they could without support from the utilities or assistance from contractors. Yet a lot of it was being sold because the public wants electric heat. In a low-rate area it is even competitive with other fuels as to operating costs, not to mention its superiorities of cleanliness, safety and long life of equipment.

The utilities in the Oregon-Columbia Chapter area have not been trying to develop electric heating load. Embarrassed by lack of power for so many years, they accepted new heating load reluctantly and at one time even imposed limitations. Hence the heating manufacturers had not received any of the usual promotion and support from utilities that other appliance business enjoys. Every type of distribution channel was used, regardless of trade policies or logic.

As a result of the meeting, NECA agreed to initiate and carry through a promotion program in its central Oregon division, around Bend and Redmond, Prineville and Madras, Ore., on the eastern slope of the Cascades. Chapter Manager Laurence C. Rodgers assigned David J. Steinacher to the members in the area, six in all, to work up a promotion with the Bend *Bulletin*.


The Symbol
of
SKILL
NECA
To split Atoms or toast bread . . . to turn a generator or heat a house—that's the span of the man who links Power to use.
In the hands of the QUALIFIED Electrical Contractor—Your NECA member—lies the skill born of years of work and learning.
Your NECA Electrical Contractor backs every job with a one-year written GUARANTEE.
For ELECTRICAL SATISFACTION, see one of these QUALIFIED NECA Members!
* Bill's Electric, Bend * Smith Electric, Bend * Redmond Electric, Redmond * Peden's Electric, Redmond * Van's Electric, Prineville * Madras Electric, Madras
NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION INC.

Newspaper ads like this one were run by NECA, referring readers to local contractors, who tied in with product ads

Big Advertising Program

The promotional effort began the last week of January and ended in March. A consistent advertising campaign was run by the individual dealers with a joint ad by NECA each Tuesday for 10 weeks. Total space amounted to two full pages or some 336 in. per issue. The NECA supplied the newspapers with 60 to 80% of the educational material and 30 to 35% of advertising copy.

At a dinner following the campaign, the contributing parties—central Oregon NECA contractors, the newspaper, power companies, allied trades and manufacturing representatives reviewed some of the

difficulties encountered with a view toward improving future campaigns of this type. Although that area, economically speaking, represented a limited market the contractors reported an increase of some 40% in the volume of business done in the like period last year. They also sold some 20 to 30 electric heat installations more than could be called normal for a like period last year.

In addition, it gave the contractors confidence that they were capable of organizing promotional programs for any type of electrical apparatus, that they could exert the leadership necessary, maintain the self-discipline needed, provide the business integrity in the installations and sales policies, and that they had vision to capitalize on new markets.

As a result of the campaign in Bend, discussions were resumed in March with manufacturers' representatives looking forward to initiating fall campaigns in other areas of Oregon and southern Washington.

Greatest need felt was that of technical education at the contractor level. While the technical information is available from the engineers of the manufacturers, the contractor representatives felt that to a large extent it has become so intermixed with sales propaganda that it is difficult for the contractor to find and to use in engineering a good installation. Further complications arise because of the varying policies at different levels, which rob the business of incentive.

As a result, each manufacturer of electric heat equipment was asked to prepare pure technical data, on principles and facts, and provide these to NECA for courses for electrical contractors, estimators, supervisors, journeymen and apprentices. NECA takes the responsibility of organizing the courses and bringing the contractors in to study, learn and to apply the knowledge. Manufacturers will be asked to do the teaching without product identification.

Out of this program has grown an appreciation of the need in Oregon of an electrical promotional organization or league, through which to bring together all in the industry for such programs. The NECA is taking the initiative in developing this idea in the industry with a general plan to establish cooperatively an electrical institute to which all branches of the industry would belong and give support.

Thus electric heat may have proved the means to weld together the long separate groups in the electrical industry in Oregon.

Crowd gathers for door prize drawing at Boise Home Show. On stage are Vic Goertzen, general chairman, Joe I. Wright, chairman of the door prize committee, and C. J. Bradford, SRVEA secretary-manager and general manager of the show

SRVEA Shows Build Prospects

THREE Electric Home Shows held across the Snake River Valley in June drew an estimated attendance of more than 75,000, according to Harold Toedtemeier, president of the Snake River Valley Electrical Assn., sponsor of the shows.

Started on a trial basis in Boise in 1955, the Boise Valley Electric Home Show grew tremendously in 1956 and 1957. This year, the association decided to hold additional shows in Twin Falls and Pocatello and they met with instant response, both from exhibitors and entire communities. In both cities, non-displaying downtown merchants staged "Home Show Days" sales events with retail stores offering special merchandise values for the days of the show.

A tie-in with downtown stores was the distribution of Door Prize Coupons by a great many business firms. Stores purchased 500 coupons for $3.50 (50c cash to pay for printing and a $3 gift certificate to be given as door prize, and redeemable at the donating store). Stores distributed the coupons free and the customer had to deposit them at the Home Show for the drawing. In Twin Falls, more than 200 gift certificates were awarded.

The shows, featuring merchandise of every description, dramatized the theme of Live Better . . . *Electrically* with a 24-sheet poster forming the backdrop of the stage area.

SRVEA purchased sufficient equipment to erect and stage a home show of approximately 100 booths and exhibits, including drapery, booth hardware and heavy-duty wiring. This was used this year in all three association-sponsored events. Since all three shows are produced on a non-profit basis, charges are only sufficient to defray actual costs of producing them. The cost of booth equipment (nearly $5,000) is expected to be amortized over a two-year period from rentals at the home shows and possible rentals for other trade shows, convention displays, etc.

► WWP added three awards recently to a rather long list of awards taken over a period of years. This time the honor came in the field of advertising and Randall Johnson, supervisor in that department, accepted the prizes on behalf of the company. Public Utilities Advertising Assn. was the awarder in three classifications—a first for the *Farm News* magazine, a first for a complete advertising program, the Freezer Leisure campaign of last summer, and a second for an individual newspaper advertisement.

NEW HONORS FOR INDUSTRY GROUP: The automatic washer appliance advisory committee of the Rocky Mountain Electrical League was featured at a vocational workshop this summer at Colorado State University in Fort Collins. The committee conducted a regular meeting at the workshop in a demonstration of how it functions. The participants, clockwise around the table: Harold "Pete" Pederson, sales manager, Rocky Mountain Maytag Co.; D. D. Walsber, service manager, Western Appliance Co.; Aud Hanna, sales manager, Ray Jones Washing Machine Co.; Ralph Hubbard, manager, Rocky Mountain Electrical League; John Sisson of Sisson & Son, appliance service engineers; Ray Jones, chairman; Martin Kresnik, training specialist of Emily Griffith Opportunity School; Leonard Smith, instructor, Emily Griffith Opportunity School; Merle Mentzer, field manager, Rocky Mountain Electrical League; Leonard Berneher, service consultant, Public Service Co. of Colorado; Carl Anderson, service manager, Ward Terry & Co.

TV Brings New Lines to Dealers

Closed-circuit telecasts are being used by General Electric Co. to present its new lines to distributors and dealers in more than 40 communities throughout the nation.

First telecast was on July 1, when three new portable appliances were shown. On July 10 General Electric Appliances Co. used that means as a substitute for its customary distributor-dealer showing in Louisville. Both programs had professional talent in addition to G-E executives and department heads; both entertained while they presented the sales story. Live displays of the appliances gave the audience a chance to examine new models at leisure.

The housewares show, which did not hesitate to poke a little fun at the company, used Orson Bean as "Cousin Hugo," whose Rube Goldbergs had always been anticipated in simple, workable models. Three new appliances were shown—an automatic saucepan; a steam iron, manufactured at G-E's Ontario, Calif., plant, that has a spray feature permitting the homemaker to sprinkle as she irons; an automatic heater with infrared element.

With Ronald Reagan as mc, the GEA show presented new home laundry and television models. The top of the line washer features a fabric key on the washer that selects the right combination of wash conditions for various types of fabric; has a dispenser that automatically releases a rinse agent during the rinsing cycle. The dryer has an automatic de-wrinkler for synthetics.

TV models use the newly developed 110° deflection picture tube, allowing cabinets to be reduced in depth by eight inches. Customer preference, the company reported, was for cabinet depth of 15 in. with a 2-in. tube cap.

Western cities to receive the telecasts included Seattle, Portland, Spokane, Salt Lake City, San Francisco, Sacramento, Los Angeles, San Bernadino, San Diego and Phoenix.

ORIENTAL SPLENDOR right out of "The King and I" set the stage at Los Angeles for Sues, Young & Brown's June promotion of Zenith radio, TV and hi-fi equipment. Sets from the movie helped to turn a hotel room into a House of Fortune. Visiting dealers saw portable radios paraded by Siamese temple maidens; looked at the rest of the line in settings suited to their design period; played at gambling tables; had a chance at door prizes—three trips for two; enjoyed the buffet

6 ft AWAY —

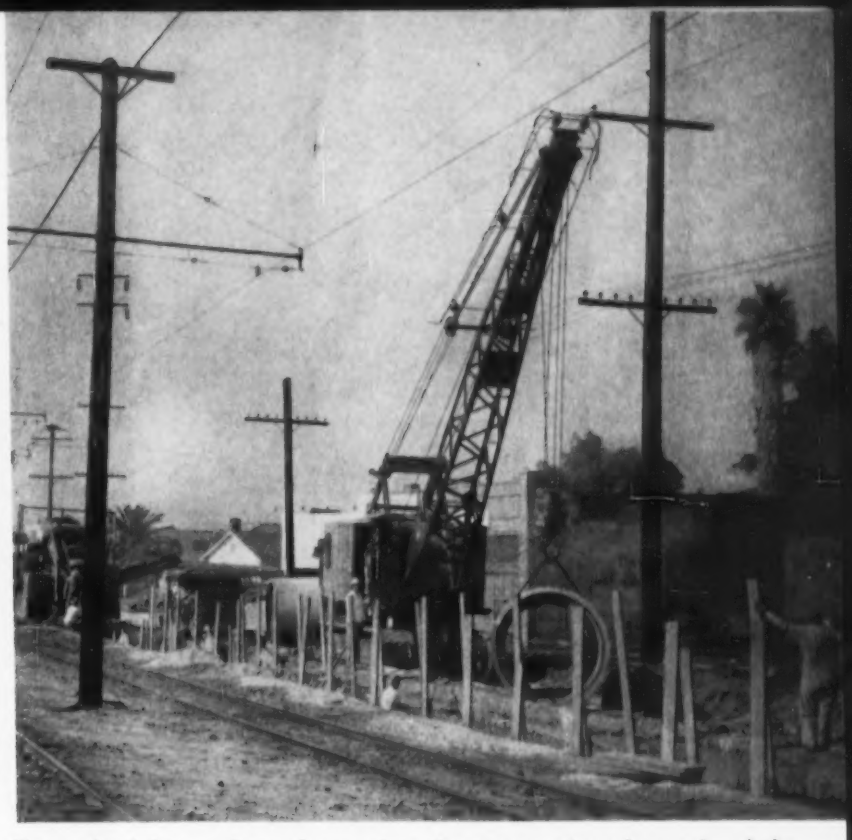
it's better than 6 ft

in the grave

Hot Wires Do the Darndest Things

Tom Hughes

Electrical Safety Engineer
California Division of Industrial Safety



Even an insulating guard around a crane boom is not approved as safe enough—why?

Many people have lived in or had their business in a booming suburb or expanding community in a rural area and suffered the exasperation of extremely low voltage during peak consumption and surges that burn out lamps and electronic tubes in off-peak periods. When the electric utility company finally brought in another 16-kv or 34-kv overhead transmission line to this community the populace were overjoyed about it.

Later, however, when they start encountering the line with their kite strings, television mast guys, reinforcing steel in new construction work and every kind of construction and agricultural equipment, they forget how thankful they were when it first came into existence.

Bewildering Inconsistencies

Probably, by now, the general public is aware that high-voltage lines are quite dangerous but they have varied and erroneous ideas about the nature of the "juice" and what can be done about it. As an example, when the subject comes up in meetings of safety officials, invariably someone proposes that cranes and other such equipment be grounded. We have even received the suggestion that truck cranes be required to drag a chain on the ground as oil-tank trucks used to do.

So, in these articles, we will cover some of the misunderstood aspects of the subject. As one reviews a number of cases where equipment or personnel have contacted high-voltage lines, one is perplexed by the complete lack of conformity in the results.

One person is electrocuted but hardly a burned mark is found on him. Another person, under apparently the same circumstances, has his clothes set on fire and his shoes burned off but remains conscious. One crane (or other piece of equipment) electrocutes one or more people and there is hardly a mark found on it or the power line, at contact. Still another piece of equipment burns the line down in a flash while workers completing the circuit on the ground receive only burns.

One elderly man was electrocuted by a crane with a boom that seemed too short to reach the upper of two lines, the high-voltage line. There were no marks on the boom and witnesses were sure it didn't contact the upper line. It was claimed this man suffered a heart attack (as he had had heart trouble in years past) but a coroner's autopsy determined that it was electrocution.

Now, how can all this be? Most adults (men or women) have received one or more shocks from 110- or 220-v systems and some have had so many they consider themselves authorities on the subject. But the assumptions they have made from their experiences do not apply to high voltages.

Nature of the Beast

In the first place, you don't even have to touch a 34-kv line to get electrocuted. You can get it off of certain bare-line wires, paralleling the high-voltage line at a lower elevation on the same pole or on another pole line alongside.

This is because higher voltages produce a greater electric field (electromagnetic and electrostatic) around them and a charge is induced on other conductors placed within this field. The actual induced current that can be drawn off depends on the position of the other conductor in this field and the distance it runs parallel to the high-voltage line.

The rules for overhead line construction help to keep the lines separated so that the current capacity of the charge is relatively negligible. In fact, it may not even burn a mark on the paint at the top of a crane boom. But the hopeless feature of the situation is that it only takes 15 to 30 ma (thousandths of an ampere) of current to electrocute a person, if it hits him at the right portion of his heart pumping cycle. And there aren't very many people that own instruments delicate enough to

measure such a small amount of current flow at that voltage.

Another feature of high-voltage lines, that produces bewilderingly varying results, is that it is difficult to contact them without producing an arc. Thus, a crane cab, swinging very slowly could bring the boom within an eighth of an inch of a heavily loaded 34-kv conductor and draw enough current to burn the conductor in two (by the heat of the arc) without actually contacting it.

If the operator just happens to draw the boom away before the line burns in two or relays out, he could draw an arc out to a length of two or three feet before it collapses, depending on the current capacity of the line. This is because the heat of the arc ionizes the air and makes it conducting.

As the arc is lengthened the resistance increases till it reduces the current flow below the ionizing level. But it is this phenomenon that causes so many operators to believe that they didn't get within two feet of the line. Instead, the current jumped across through the air to the boom, which was minding its own business. Actually, a 34-kv potential will not initiate an arc across a gap of more than a half inch or so.

Other people will claim that it jumped more readily because the day was foggy, but this is also untrue. Fog is practically pure water, which is a relative nonconductor. Utilities use water to wash the dust off their high-voltage insulators, using a hose stream from a nozzle in the hands of a man on a tower platform a few feet away.

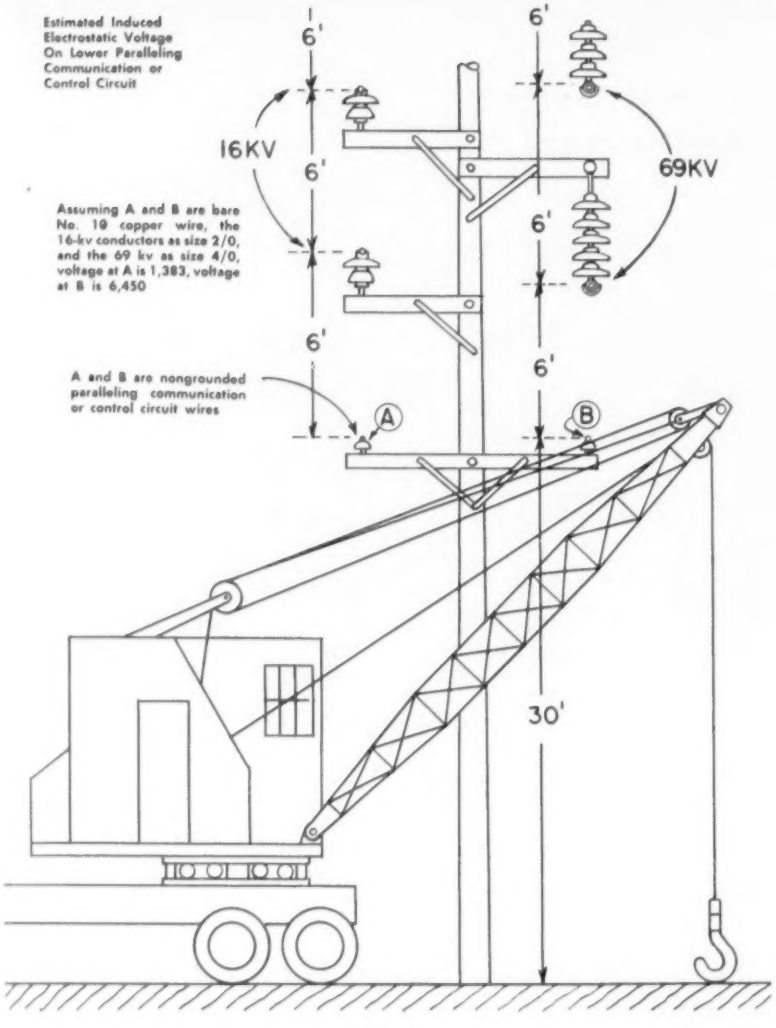

Estimated Induced Electrostatic Voltage On Lower Paralleling Communication or Control Circuit
Assuming A and B are bare No. 10 copper wire, the 16-kv conductors as size 2/0, and the 69 kv as size 4/0, voltage at A is 1,383, voltage at B is 6,450
A and B are nongrounded paralleling communication or control circuit wires
16KV
69KV
6'
6'
6'
6'
6'
6'
30'
A
B

Fig. 1

Disconcerting Factors

There are other factors that contribute to the inconsistent results of contacting high-voltage lines, and the confused reports accompanying them. One is the matter of transformer winding configuration. Distribution lines operating at lower voltages, such as 2,300 to 5,000 v, are called primaries and are often fed from a delta transformer bank. Such delta-fed lines are not operated as grounded systems. This means that equipment, standing on the ground and contacting them, will not draw enough current to burn the line down or open a fuse.

They are the most dangerous for uninformed workers because they are carried at lower crossarm level on the pole and their insulators do not appear to differ in shape or size from those of the secondaries carried on the next lower crossarm. However, if one looks carefully, it will be noticed that their arm always has "High Voltage" signs.

But what did we just say in the earlier paragraph? Since they are not fed from a transformer bank that is deliberately connected to ground (not a grounded system), contacting equipment may not draw enough current to cause any fireworks and warn personnel on the ground.

So, because an uninformed operator didn't see anything happen when he contacted the line with his boom he thinks it isn't a high-voltage (over 750 v) line and doesn't even remove his equipment from contact. But this doesn't mean that one cannot get electrocuted from touching the contacting equipment while standing on the ground.

Any system, whether operated as a grounded system or not, supports a capacitive or "static" charge between it and ground. If some conductive object (such as a guy wire or crane on rubber tires) contacts it, it rushes a "charging" current down into this vessel, seeking a nearer position to ground. While this charging current may not cause any visible arcing at contact it can certainly kill grounded persons.

Note that this charging current is not to be confused with the "induced charge," illustrated in Fig. 1. The charging current from this nongrounded primary line is an extension, into the contacting object, of line capacity at line voltage. The kva capacity is there and if the contacting equipment were thence also to contact another conductor of the same line one would observe plenty of fireworks.

Another factor that confuses the

issue is line protection by sensitive relays. Higher-voltage lines (7,500 v or higher) are often protected by circuit breakers and relays that open them on slight line disturbance. These relay setups usually include an automatic reclosing feature that energizes the line again after a time interval of so many seconds. If the fault hasn't cleared itself the relay again opens and locks out.

The purpose of this setup is to prevent burning the line down on a momentary contact by some object and, in some cases, it may allow a workman to get free if he has accidentally fouled it with some material or equipment. It sometimes defeats its purpose, though, upon contact by a crane or other such equipment.

The operator was conscious of a flash or sputtering, upon contact with the line, but as he swings the boom free there is no further sign of energy. He may decide the line is dead and try to complete the operation he had started. Then the breaker recloses and kills someone.

On the other hand, returning to the matter of the arcing contact, a quick, glancing strike by some object may draw a long arc that doesn't burn the line down. This may be done by moving equipment or it could be a contact by a measuring tape, kite wire, television antenna guy, etc. The latter class of objects would burn in two on contact with a conductor of a normally grounded system and draw a long arc as they parted. The boom of a crane could also draw a long arc, as we stated before.

Such a long arc presents a resistance to direct flow of current and is labeled a "high resistance fault." It may or may not pass enough current to open the line protector. But, what we want to call attention to is the peculiar inconsistency of injuries to persons connected with such a momentary contact.

There are cases where two or three persons are involved in the passing of current to ground. One or two persons may be electrocuted with little sign of burns on their bodies while a third person may have his clothes set on fire and his shoes burned off but he doesn't lose consciousness.

Of course, all this delving into peculiar circumstances contributes nothing toward the simple prevention of trouble by keeping things away from high-voltage lines. But what we are trying to do is dispel the cloak of mystery that some culprits try to draw around the antics of high voltage (when turned loose) as a defense of their share in the performance.

Actually, if proper instruments could have been in action as this group received the momentary flow of current, it would be shown that the major portion of the current was handled by the body of the one who wasn't electrocuted. The explanation is quite simple. He had been expending considerable energy at work in the hot sun while the others had not. His body was covered with highly conductive perspiration and his clothes and shoes had absorbed their share.

The current took the easy path over the exterior of his body and did not affect his internal organs while a small amount of it passed through the organs of the other persons involved. However, if this had not been a fleeting collapse of flow from a momentary contact, he might not have escaped electrocution. A continued flow of current would take a course through his body after his skin was burned.

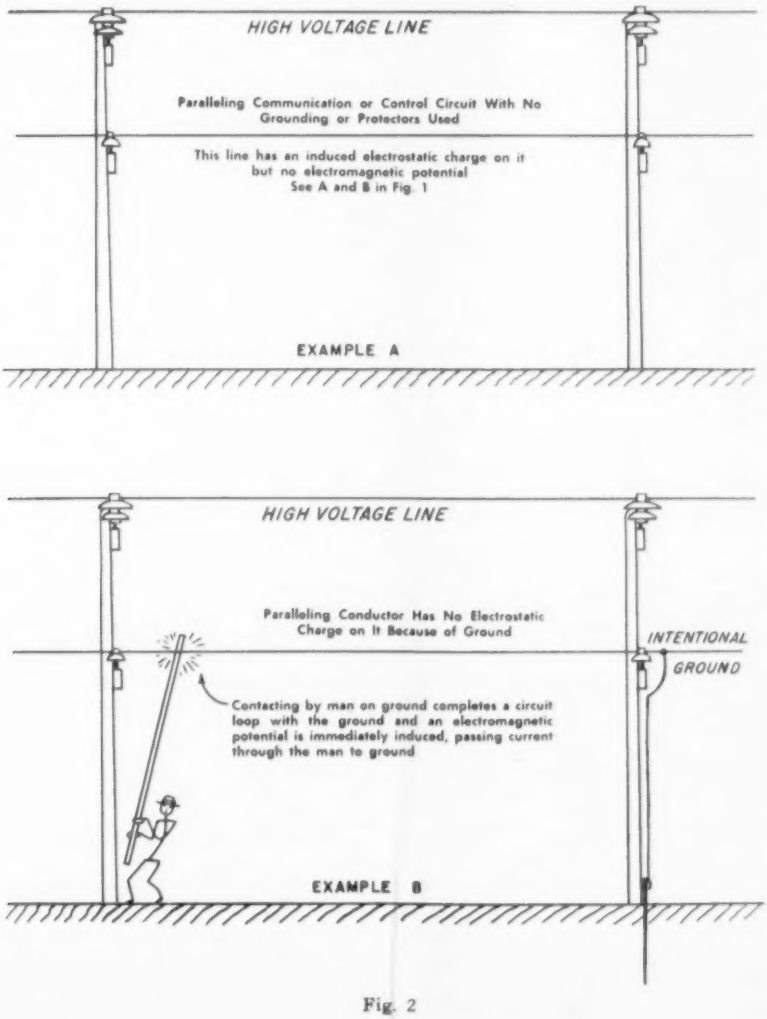

HIGH VOLTAGE LINE
Paralleling Communication or Control Circuit With No Grounding or Protectors Used
This line has an induced electrostatic charge on it but no electromagnetic potential See A and B in Fig. 1
EXAMPLE A
HIGH VOLTAGE LINE
Paralleling Conductor Has No Electrostatic Charge on It Because of Ground
INTENTIONAL GROUND
Contacting by man on ground completes a circuit loop with the ground and an electromagnetic potential is immediately induced, passing current through the man to ground
EXAMPLE B

Fig. 2

Proposed Safeguards

So now we are getting somewhere—or are we? Those who propose to ground the vehicle will say, "It looks like our proposal will cure these features you have brought out." But let's see how it works.

In the first place it is next to impossible to maintain a good ground connection for a working crane over normal dry soil. But, if one could and if the only hazard we had were the induced charges on paralleling lines, grounding might bleed off the charge without injury to me in contact with the equipment.

On the other hand, electricity (especially high voltage) takes devious paths to ground and some would probably take side paths through

those in contact with the equipment even if the major portion followed the grounding conductor.

But the worst aspect is that the boom usually contacts the high-voltage line itself and nonrelayed lines would be more likely to burn in two and drop to the ground if the vehicle were grounded. Energized lines dropping among people present even more hazard than that of equipment contacting them.

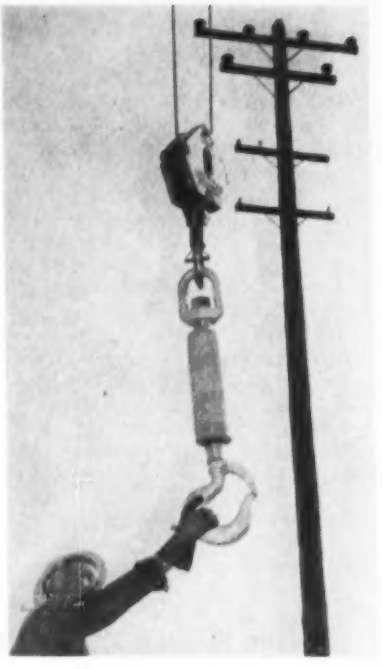
Another proposal is the use of an insulated fender above the boom. One company, which operates many cranes on pipe-line work, has equipped its crane booms with lightweight pipe frames mounted above the boom on high-voltage insulators of the class rated for around 20 kv. Other people may mount wooden frames up there to fend the line from their booms.

The Division of Industrial Safety will not accept any such fender as a means of intentionally working nearer than six feet to the line, for two reasons. The first is that no fender can prevent operations from bringing the vertical run of the load line into contact with the high-voltage line. Second: even if the fender did protect the load line, as well as the boom-supporting lines from the top of the cab, it would give the operator a false sense of security and he would be burning or breaking the lines in two and dropping them on top of people.

While an insulated fender may prevent flow of current, upon contact with one conductor of an overhead line, there is nothing to stop it from pushing one conductor against the next one, causing a "dead short" and sudden burning in two of these conductors. But, if the same care is used to avoid contact with the line as we would assume is being used without it, the presence of such a fender could save the life of a man handling a load on the ground by preventing contact through an unintended overswing of the boom.

The latest proposal is an insulated link in the load line above the load hook. Bullard Industrial Safety Equipment Co. is marketing a link rated up to 25 tons load and tested at 50 kv. Miller Products (at 1100 E. Second St., Pomona) manufactures a link that is tested at 100 kv. The present models handle loads up to eight tons.

Such a device can certainly save some lives because the majority of workers in crane injuries are electrocuted while holding onto the raised load being handled by the crane. It doesn't prevent injury to one touching the crane itself, while standing on the ground. A combination of the overhead fender and this link would fairly well protect men on the ground if the insulators were kept clean but they would never be licensed by the Division of Industrial Safety as means for intentionally operating nearer than six feet from an energized high-voltage line. Such an insulating link would accumulate dirt on it and even scratch marks across its surface, if carelessly used. In foggy weather this would pass some leakage, and remember: it only takes a flow of a few milliamps to kill a person. Furthermore, as we stated before, it would give the operator a false sense of security and energized lines could be dropped on persons' heads.



Insulating link for hook adds some safety but cables can still burn down line

Proximity Warning Devices

There are several electronic warning devices available that sound a warning to the operator as the boom approaches a high-voltage line. These, if used as intended, can be of great assistance to the operator (especially when operating in the dark) and could certainly save lives. But they are still not acceptable to the Division of Industrial Safety as a means for permitting intentional operation nearer than six feet to a high-voltage line.

They use an antenna wire, stretched up through the boom, and proper connections would have to be maintained as sections of boom are added or removed. The warning signal is produced by this antenna coming within the electric field (which we mentioned earlier in this article) surrounding the high-voltage conductors. This field expands to greater or lesser radial distance from the conductors in proportion to the voltage and amperage they are carrying. The controls for these warning devices have to be readjusted each time one moves from proximity with one line to that of another at a different potential.

This adjustment can easily be made, if one doesn't forget it, but the normal operator is too preoccupied with other things and the frequent ringing or buzzing of the device just annoys him till he shuts it off. As an example, if one has just finished working near a 16-kv line and the adjustment was set for proper distance from this line, then it isn't going to serve near a 4,160-v line till it is readjusted for that.

Furthermore, there is no field around the bare control circuit or other conductor that is paralleling 16 kv for a few miles and proximity to this line would give insufficient warning. But you recall that we showed how one could be electrocuted from the induced charge on such a paralleling conductor.

Innocent Losers

All this time we have been talking about electrocuting persons at the scene of the offense or burning down energized lines on the heads of sidewalk superintendents. But there are many chances for injury of persons not even in sight of the equipment that contacts the line.

There may be refining or heat-treating operations in industrial plants that are extremely dangerous to attendants if the electrical supply is shut off from auxiliary equipment. There are many machining operations that could cause injury if the power were suddenly lost. Also, many work areas where sudden immersion in darkness could present hazards.

There was the case where a crane carelessly ran into a lateral guy stretched across a highway between two poles. The violent jerk caused two conductors of a high-voltage line (supported on one of these poles) to swing together. One of them burned in two and fell on a parked car. A nearby refinery was out of power till they could switch

to another incoming line. It was only by fortunate circumstances that there were no deaths or injuries connected with this mishap.

On the other hand, energized lines dropping on dry grass, forest land, or easily ignitible buildings, have caused fires that endanger persons, not to mention loss of property and valuable watershed.

The simple facts we are trying to emphasize are that there is no safe way to work in close proximity to high-voltage lines while they are energized and there is no justification for taking chances with the serious consequences.

Why Six Feet Away?

There are definite reasons for keeping six feet or more away from high-voltage lines. The Navy enforces 10 ft in its yards. Probably the most important reason is the instability of equipment and material that is capable of reaching from the ground up to high-voltage lines. Mobile work cranes (the usual offenders) are the most unstable of all.

The very nature of a crane makes it unstable because it is primarily a balancing arrangement and depends entirely on adequate counterbalance weights (hanging on the rear of the cab) to support the load. Cranes that have to operate with boom extensions are often provided with means of adding additional counterweights. So you can say that they usually operate like a teeter-totter.

Now, what this means is that as they pick up a heavy load the boom and cab tilt forward. On the other hand, if the rigging procedures were faulty and the crane loses its load in midair, the cab rebounds from its forward tilt and whips the boom up in the air. In such a mishap it is not uncommon for the boom to flip clear over backward, crushing the cab roof and anything on the ground to the rear.

Another mishap may occur when the operator swings too fast and lets a heavy load get out from under the boom (either lagging on the swing or overswinging, if the cab rotation is stopped too hastily). This may place a lateral stress on the boom, for which it was not designed, and it literally folds up. Cranes may settle into soft ground as they swing a heavy load without outriggers and turn completely over on their sides. Such mishaps may be remote but they are an ever-present possibility to be reckoned with and it is easy to see that the boom would need a large chunk of the outdoors as it flips through the air.

But, in regular operations of a normal mobile crane with 50 or more feet of boom attached, the tilting of the cab as heavy loads are lifted is going to move the head of the boom up or down two or three feet (depending on the angle of inclination). Thus, when an operator lowers his boom (with a load on it) to what he thinks will just pass under an overhead line and then sets the load down directly under the line, he is just betting that it won't raise up into the line as he releases the load.

But cranes aren't the only offenders. Orchard spray rigs (passing over irrigating dikes every few feet) often raise the men on the spray platform up into guys or lines when they thought they would clear. Long materials of every description: reinforcing steel, pipe, aluminum ladders, walnut shaker poles, etc., become unwieldy as they are upended.

A painter was up on a tower, hoisting an aluminum ladder up to the platform he was standing on. A strong wind whipped the ladder over into a 110 kv line, 12 ft away, while he held onto the end of it, and electrocuted him.

Another reason for keeping more than six feet away from high-voltage lines is the matter of induced charges on other paralleling lines (as we mentioned before). General Order 95—Rules For Overhead Line Construction—requires that high-voltage lines shall be above communication lines and other such conductors on the same poles. The other wires must be at least six feet below lines of more than 7,500 v. And this is a good place to point out that staying six feet away from high-voltage lines means above or below them or from either side.

Fig. 1 shows the calculated electrostatic voltages that would be induced on paralleling conductors with no intentional ground attached. The induced voltage would be the same, regardless of the length of line exposed. However, the actual injury sustained by a contacting person would depend on the available current and the current level is proportionate to the length of the paralleling section of line.

In Fig. 2, example A illustrates the condition for an induced electrostatic charge. No electromagnetic potential-to-ground exists because there is no circuit completed but an electrostatic charge exists as long as there is no ground on the lower line.

In example B, no electrostatic charge exists on the lower line because it is bled off by the intentional ground at the right hand post. However, because of the ground path at one end of the line, when the man at the left of the picture makes contact he completes a circuit through this paralleling line to ground. Thus an electromagnetic potential is immediately induced on that section of the line and the available current is proportionate to the length of this loop.

In all this discussion, we hope we have proved that the *only safe treatment for an overhead high-voltage line is to stay well away from it; and six feet is none too far.* When work must be done under or near such a line the utility company must be consulted.

In some cases the line is an alternate feeder and can be de-energized for short periods of the day. Otherwise, the utility can move its line temporarily or design suitable barriers for allowing safe work in proximity. This will entail additional expense for the one who is working near the line but such expense must be considered a part of the job cost. It certainly will not compare with the cost if a tragic mishap occurs and such tragedies are happening all too often these days.

Pay-up Policy In Pocatello

Seven electrical contractors in the Pocatello, Idaho, area decided to put an end to the abuses on the payment to them as subcontractors for work that they do. Hence they adopted a policy which they distributed to the lumber dealers with contracts. A copy of the policy, which may well be circulated by other contractors elsewhere, is as follows:

Payment Policy for Electrical Contractors

Residential Bid Contracts:
65% on rough-in completion.
This shall not be construed as full value of work installed to date.
35% on completed electrical job.

Commercial and Other Work:
Monthly job progress payments.
If payment is not made as specified, electrical work on job will be discontinued until payment is made.

Final Payment:
Final payment to be made within 30 days after completion of electrical work.
If payment is not made, lien or other rights will be exercised. Participating electrical contractors approve the above. This policy shall apply to all contract work without exception.

Arizona was the first in the West with an electrical joint industry board . . .

Here's How It Works

How does a joint industry board operate? This question naturally follows the outline presented in the May issue of the purposes for such a board. To find the answer, it was necessary to go to the first such board set in motion in the West — that in the State of Arizona.

The Electrical Joint Industry Board of Arizona Inc. has been operating since early 1956 and the wiring modernization and Housepower program of both utility companies is now channeled through it. It has the enthusiastic support, not only of the electrical contractors and International Brotherhood of Electrical Workers but the utilities, manufacturers and distributors and even the Appliance Merchandisers Assn. of Phoenix.

People in the industry are frank in crediting the success and the respect they have for the joint board to the leadership. A constructive, sales-minded attitude on the part of its president, Al Wendt of the IBEW, and Jerry Kelleher, its secretary-manager, who is likewise manager of the Arizona Chapter, National Electrical Contractors Assn., backed up by a 16-man board, eight contractors, not all NECA, and eight from the union, are determined to make it succeed on a high plane.

In organization form, management of the activities of the board is written into the bylaws. This is set up logically enough that the NECA manager be both the secretary and manager of the joint board. However, the IBEW will no longer approve such boards in order to free the union and contractors' association from any hint of criticism such as has been heaped upon other union groups. Other joint board operations being set up, such as the San Francisco Bay area, are being done with trustees for management.

However, the Arizona EJIB is providing safeguards. The board of directors operates through a legal counsel to direct the general manager and has set up eight committees to handle the eight programs that it embraces. Area subcommittees are appointed where needed.

These committees consist of one on public relations, research and safe wiring, budget and audit, education and scholarships, apprenticeship and advanced training, construction industry relations, adequate wiring and certified lighting, and interindustry farm electrification.

The public relations committee is charged with publicity and advertising to the public and contact with local organizations and public bodies.

The research and safe wiring committee concerns itself with codes, ordinances and state legislation such as that proposed at the recent session of the legislature.

The budget and audit committee keeps a critical eye on the funds and their dispersal.

The education committee is providing scholarships of $1,000 a year at the University of Arizona at Tucson and also at Arizona State College at Tempe to take care of two students on a four-year scholarship. This is made available to the sons or daughters of contractors or journeymen in the state.

The apprenticeship and advanced training committee is the most active of the group. It has charge of the joint apprenticeship training of 88 apprentices since 1954 and through 1957. Also being instituted is a journeyman's training course to bring him up to date on new methods and materials. A job management course, to run for 20 weeks, is also being conducted. There are 75 in this class.

The construction industry relations committee handles labor relations and negotiations as well as relations with other crafts in the construction industry.

The adequate wiring and certified lighting committee is likewise one of the most active committees. It is the one that is conducting the Housepower and the wiring modernization program and the certified lighting program in the State of Arizona.

The interindustry farm electrification committee is just in the process of being formulated. Its aim will be to develop means for more power on the farm.

The construction industry relations committee likewise aims to eliminate bid shopping and peddling. It is a member of the Construction Practices Board of Arizona, of which all members sign a pledge of compliance with their bidding practices. It is significant that 80% of the general contractors in the state are signators to this pledge as well as the plumbing, masonry, roofing, steel fabricators, electrical contractors, air conditioning, painting, glazing and home building contractors. This separate board is paid $5 a year membership for each electrical contractor. This helps to pay the printing and operating costs. No bid depository has been set up. This was turned down by the construction industry and efforts are being made to control the practices voluntarily through the pledge of cooperation.

In Tucson a different system is operated. They have what they call a "confirmation." Four hours before opening time, contractors drop a copy of their bids in the mail to the NECA office, which compiles a list of such bids, sending them only to those who have participated. The compilation is sent out only sometime after the bids have been opened. The architects in Arizona seem to appreciate this tabulation. It gives them a better honoring of their specifications.

How Housepower Works

As an example of how one of the major activities is organized, take the Housepower program. The joint industry board employs Vic Jennings as a full-time salesman on commission plus expenses. Although he has a small base pay, most of his income is derived from commissions that provide incentive to follow up all leads and develop business. He has office space in the NECA office where phone calls are taken for him.

Both utilities channel their service calls to him after a preliminary follow-up. Arizona Public Service Co. and Salt River Power District make

the preliminary call to correct trouble reported to them by customers. When their representative finds wiring conditions inadequate, they advise the customer to call the Housepower salesman in for a survey. If immediate correction is necessary, they call directly to the Housepower man to get emergency quick service from one of the contractors.

Most of the leads, however, come from advertising in the newspapers, over radio, in bus cards, local magazines, television spots and direct mail. Both of the utilities have sent out direct mail folders to their customers inviting a Housepower checkup. There has been 10% return on the direct mail pieces sent out by Arizona Public Service. A free 150-w light bulb is offered as an inducement for having the survey made.

The direct mail piece has a return post card, which is sent direct to Housepower headquarters. The utility is then notified and the utility man takes a light bulb and the Housepower rating form. A letter following up on the call is sent to the customer afterwards. Where a live lead is developed, the utility man notes "buying leads" or special conditions that may aid in making the sale.

With this information and a rating form, the salesman then goes out and makes an estimate, sells the job, arranges the financing and sees the job through.

As of Jan. 1, 1957, the rewiring business around Phoenix for the year 1956 amounted to $500,000 worth of work on 3,694 jobs, or an average of $167 per job. Since the first of the year the Housepower program was integrated with it and in the first three months' operation there have been 65 jobs for a total of $18,106. This indicates an increase to $279 per job.

Financing for the jobs is available from all the banks in Arizona under Title 1, FHA. The "Reddy Hookup" plan of Arizona Public Service will finance up to $200 worth. The Salt River Power District has been contemplating a finance plan also. Home modernization loans are also available from the banks under their own plans.

Selection of the contractors to do the work is done by the customer.

Where no preference is expressed, the contractor located near the person's home is usually contacted to follow through.

A similar program was in preparation for Tucson, which is by another utility.

The Housepower headquarters make an analysis of the prospects received and the disposition of leads that are received is made periodically to the executives of the two power utilities, the joint board, the Appliance Merchandisers Assn. and IBEW. This indicates the source of leads, their number, the sales derived from them, the volume represented, number of estimates made and diagnosis of why some were not completed. The final estimate form is made out in four copies, one to the property owner, one the electrical contractor, one the bank and one kept on file. The salesman likewise makes a daily report of the calls made, the mileage and the time.

Running a joint industry board operation cannot be just left to a paper organization and a manager, Jerry Kelleher declares. "It requires very close cooperation, continued working cooperation to make it succeed," he said. "You can't start it out and then neglect it. We hold at least one meeting a week of the board in order to check results on all the activities and to direct all operations. It is the only way it can be made to work."

A very simple code of business practice is signed by everyone working under the joint industry board in Arizona. In itself it is the basis for a successful operation. The code is as follows:

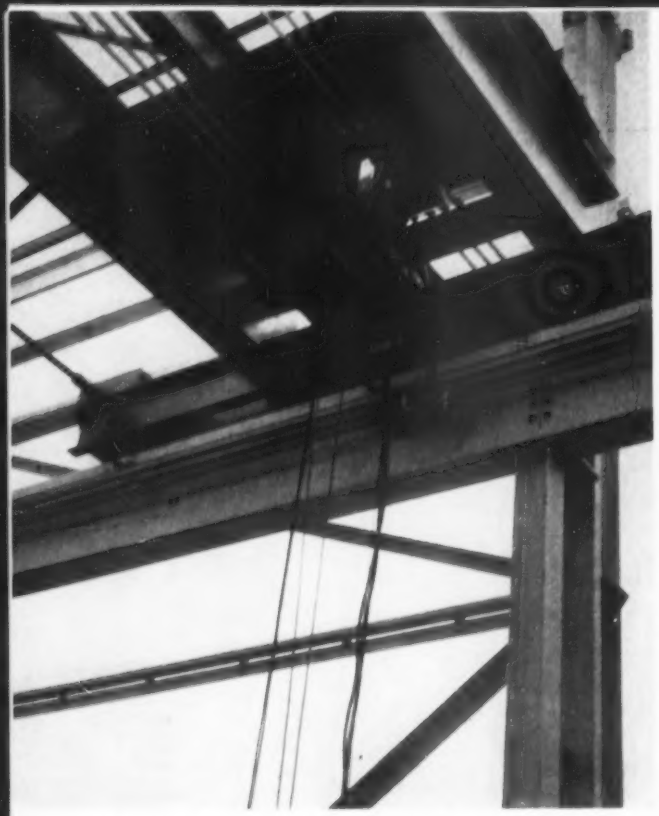
"To honestly present the merchandise offered, to install the job according to plans, to strive to become more efficient in order to serve the public more economically, to maintain high standards to protect life and property, and for members to conduct themselves according to the highest standards of business integrity.

"All work within the jurisdiction of the Electrical Joint Industry Board of Arizona Inc. shall be done according to specifications and/or the minimum standards of the National Electrical Code as is applicable."

If other joint industry board operations are run as Arizona's is, under such principles they can earn the same respect from the other branches of electrical business that has been gained in Phoenix. A real teamwork feeling prevails in that sunny state.

Get your HOME WIRING
✓ Checked Now IF:
• lights dim, TV picture shrinks
• fuses blow, or circuit breakers trip
• you need additional wiring or convenience outlets for new appliances
You'll receive FREE
• survey and Housepower rating of your home wiring
• cost estimate for needed wiring changes
• 150-watt light bulb
Postage Will be Paid by Addressee
No Postage Stamp Necessary If Mailed in the United States
BUSINESS REPLY CARD
FIRST CLASS PERMIT No. 2342 PHOENIX, ARIZ.
Housepower Headquarters
1306 W. Washington Street
Phoenix, Arizona

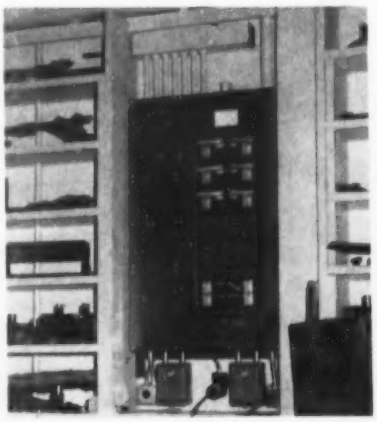
Utilities sent this return post card to all customers. Other side, signed by a customer, asks a representative to Housepower Headquarters to make an appointment to check his home wiring and rate the Housepower, leaving a lamp bulb



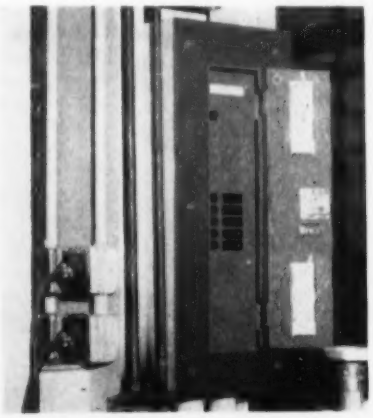
All cranes are fed with insulation-covered 8-bar and the same for motor control lines on cranes. There are two 10-ton cranes, one inside, the other outside over a storage yard. Two 5-ton cranes serve the side wings. There are also some jib cranes mounted on pillars. Above, a view under outside crane

Provides Zimmermann With Power for Metal Craft

Known for its old-world skilled craftsmanship in metals, Zimmerman Iron Works of Denver chose the skilled electrical craftsmanship of Sam Hawkins and his son when it came to engineering and installation of the lighting and power distribution system in its new and expanded plant. Good seeing was furnished by 30 f-c of light from 108 high-bay 800-w incandescent reflector lamps in the 201x140-ft shop area, controlled from four panels, three lamps to a No. 10 circuit. Outlet boxes for lamps were pulled up from the floor into countersunk holes drilled in the gypsum roof slab. Conduit was run in a 2-in. gypsum fill above that. This method cut time about 50%. Lamps are 26 ft from floor on 15-ft centers. This keeps them above the cranes from which they can be relamped as needed. Anticipated expansion is provided for by ample main switchboard space and a channel under the board to the outside for future runs of conduit to serve an addition to the building over outside craneways.



Power panel for toolmaking shop (right) neatly placed between tool shelving. All receptacles are of grounding type



Lighting panels are mounted on one side of pillars, power on the other. All starters and panels are mounted on the pillars. Welder outlets painted red are the 4-wire Arktite, not shown because they are on the other side of pillar

Main power supply comes to the outside of the plant through the roof on a 2,500-amp low impedance bus duct to the main board (left). The board, with space for three more main breakers, has two 1,000-amp breakers for power, another for lighting. Lighting feeders go to four 200-amp mains at left of board. Lighting circuits run in conduit under the floor to pillars to light panels. Power feeds up through two runs of 1,000-amp bus duct across upper wall to backs of the two main crane beams. Some 80 plug-in switches feed from these power buses to panels and starters on pillars for machines on floor. Most machines operate on 240-v, and 115-v for power tools. The system has flexibility for moving of machines

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Men Wanted

Manpower to do all the electrical work there is to be done these lush times seems to be worrying contractors more than anything else—certainly more than profit. Bids still sacrifice that in a mad race to "win" more contracts—for which there aren't enough skilled men to perform. Although the union is happy to get the lame, the halt and the blind off the bench the contractors are not. At today's high wage rates time costs too much to lose in slow, ignorant or poor workmanship—or coffee.

Crazy, man, crazy!

Material prices continue to inch upward. Wire fluttered when copper dipped again but the distributors wanted to take up the slack in a longer margin for themselves. Of course it appears fictitious in view of the way they give it away to beat their own competition. Steel's raise was only beginning to ooze up through product repricing. But it is inevitable.

Join the procession

More wage rates were negotiated upward, despite Utah Senator Watkins' plea for moderation in demands. Seattle area settled with IBEW Local 46 on a one-year contract for a 15¢ hourly raise plus 2¢ more (up to 14¢) per hour for vacation and 7½¢ health and welfare. Base is $3.40. In Los Angeles and Orange Counties, on a one-year contract, the scale will be $3.90, including a 4% vacation. This is 15¢ higher than the present Bay area scale but will be 10¢ lower after December.

A few more

Other areas too report higher scales—Vallejo goes to $3.666 plus 10¢ h&w and 5¢ for the area joint board beginning Oct. 1. That totals $3.85 with pension. On Feb. 1 Vallejo (Napa-Solano) will match the Bay area program and bring its annual date to June with the others. In Salinas, after a two-day walk-out, asking for $4.10, the local decided to accept $3.72. From San Rafael comes word Sonoma, Mendocino and Lake Counties settled for a two-year contract, increase from $3.38 to $3.62 now, to $3.94 Jan. 1, to $4.06 next July.

Marking time again

Behind the black 8-ball—the segregation fight in the Senate lies the Contract Bill, S-2300, and HR-7168 which the House passed, so near and yet so far. Approved by even AGC in its present form, it should pass if the Senate ever gets to vote on it.

Salt of the earth

Two of the industry's swellest guys were taken by death in July—one in San Francisco, the other Denver. In San Francisco the ever popular Len Johnson, representative of the Thomas & Betts Co., died July 3.

A real leader

Bert W. Stiles of Denver was the other. Twice governor and three times president of the Rocky Mountain Chapter, NECA, he helped organize the Denver Electrical Modernization Bureau and was its first president. He had only recently sold an interest in his Stiles Electrical Service Inc. to Commonwealth Electric of Omaha. The NECA Chapter is establishing a scholarship fund in his name.

Good record

FHA reduced the premium rate for insurance of Title 1 home modernization loans because of favorable pay experience.

Men in the news

About people—had you heard? Dan Searle, prominent electrical contractor of Monterey, was recently re-elected for a fourth term as mayor of the city. . . Oliver F. Burnett, popular and forthright president of NECA, was renominated for the presidency by the executive committee and will be voted on for re-election by the board of governors at the NECA convention in Cincinnati, Nov. 10-16. Burnett heads a Chicago contracting firm and has a subsidiary in Phoenix. . . F. M. "Jack" Carter of Phoenix is new president of Local 266, IBEW, and A. J. Kuykendall is business manager. . . Two Westerners will appear on the IES national technical conference program at Atlanta, Sept. 9-12. They are Philip F. O'Brien, University of California, Los Angeles, with a paper on calculations and James H. McCulloch, Independent Testing Laboratories, Boulder, Colo., chairman of the progress committee. . . Ralph Neilson is launching a new electrical publication in Seattle called "Electra." The first issue was supposed to come out in July. Neilson has been secretary-manager of the Electrical Contractors of Washington, an independent organization. . . Charles R. Long, former Westinghouse lighting engineer, announces a new firm of Long & Associates as manufacturers' representative at 1210 Canterbury Drive, Burlingame, Calif. . . William O'Keeffe, "The Fan Man," is running for supervisor in the city of San Francisco.

Distributors growing

Distributor news includes—Electric Supply of Salinas recently moved to a new building at 406 Griffin St. with greatly enlarged facilities and stock. . . Westinghouse Electric Supply Co., taking note of the growth in the southeast Bay section, has established a branch of its Oakland branch in Hayward. . . Rite Lite Supply Co. of Denver has moved into a new and much larger building at 2826 N. Speer St., where it claims to have one of the largest lighting fixture displays in the West. Specializing in lighting fixtures only and some small appliances, it is distributor for more than 25 makes.

Plan to be active

Rocky Mountain Chapter, International Association of Electrical Inspectors, announces its 1957 officers as Howard G. Pease, Mountain View Electric Assn., Limon, Colo., chairman; Don R. Murtaugh, Mountain States Inspection Bureau, Denver, vice-chairman; William F. Stultz, Southern Colorado Power Co., Canon City, second vice-chairman; and D. G. Mulligan, Mountain States Inspection Bureau, Denver, secretary-treasurer. The group decided to hold meetings in other places than Denver vicinity. Next will be at Canon City in September.

Who's who

Montana Chapter, IAEI, officers also have been announced. A. C. Foucher of Lewistown is chairman, Harvey Stone, Helena, vice-chairman, and Al Hull, Lewistown, is secretary-treasurer. Lewistown was selected for the next annual meeting in the spring.

Spread to Harbor area

Harbor area meeting, the first, of Electrical Maintenance Engineers Assn. of Southern California, was held in Long Beach July 18. Success of the recently held first meeting in San Fernando Valley encouraged a like meeting for the Harbor area along the same lines. It included a table-top exhibit. Otto K. Olesen, Los Angeles Postmaster and initiator of the spectacular Hollywood preview lighting, was the featured speaker.

Take meeting inland

Lively interest in the new Rocky Mountain Chapter of National Industrial Service Assn. calls for a meeting at Durango, Colo., Sept. 20-21, with Mike Logan in charge. Speakers will be William Roarke of Bearing Distributors, Kansas City, and Walter Ziegenbein of Chicago.

Post mortems correct the future

A construction coordinating committee is helping to put more sense and less misunderstanding in plans and specifications in the Fresno area. Initiated by the Fresno Chapter, NECA, Manager Ray Buckley and Architect Morris J. Metz, the committee has been operating about 18 months, since March 1955. Metz was chairman until recently and now Walter Wagner of Wagner & Associates is chairman. Buckley is secretary. It operates under the sponsorship of the Builders Exchange and its original 12 members have been enlarged to 15, representing architects, structural, specialty, plumbing, plastering, sheet metal, roofing, painting, general and electrical contractors. The plans and specifications of a job, after the bids have been opened and awarded, are reviewed by the committee and seven subcommittees. These bring in reports for improvement of future specification writing and clarification of jurisdictional and craft coordinating difficulties.

Figures to figure

Computing wages these days becomes very complicated, so Ernest Kramm, manager, Northern California Chapter, NECA, has charted for his members the wage rates for journeymen, foremen, general foremen and apprentices of the various grades on a straight-time hour basis, including the health and welfare, pension, vacation and even chapter dues. Uncle Sam also has his bite so contracting often becomes more accounting than wiring in these modern times.

Among the new

Among manufacturers are several new developments. . . Wakefield Co. has a packaged "Sunshine Ceiling" that will fit into standard 5x7 or 5x8 bathrooms or can be used in kitchens, employing six 100-w incandescent lamps with 2x2-ft plastic diffusers. It is a fixture for it is independent of wall attachment. . . Paramount Industries has announced one of the first commercial and industrial fixtures to use the new General Electric Power Groove lamps. It is notched for 10% upward light also. . . Delta Engineering Sales Co. has a ground alert to use on three-phase ungrounded systems, which gives warning of the first-phase ground. . . Ingenious use of a triangular-shaped channel as the top member of a steel joint, Ceco Steel Products Corp. provides a new type of underfloor raceway for telephone or power wiring. . . Superior Electric Co. packages its Luxtrol light control equipment for spectacular dimming of displays and theatricals in units that can be assembled in any number of combinations or added to at will. Also has a new 750-w dimmer for residential or commercial use.

Loan the right kit

Temporary electric service equipment, not exceeding 10 hp or 10 kw of light, is furnished to builders and subcontractors by the Department of Water & Power, Los Angeles, under what it calls Schedule CTS. An installation and removal charge of $30 is made with a monthly charge of $2.50 per meter plus 2.5¢ per kwh for energy. The contractor must supply a properly braced 4x6 solid timber post and a satisfactory grounding electrode. The utility supplies a combination meter and twistlock receptacle unit.

Business power

Powerating is the slogan term applied to the new commercial wiring program launched by the National Adequate Wiring Bureau. The campaign for 1957 has Housepower rating sheets adapted for specific types of business firms, first of which is the drugstore powerating form. The direct mail material features a folder called "Are You Getting the Most Out of Your Electricity?" It invites the customer to ask for a powerating for the occupancy in question. Future mailing pieces will be directed to food stores and markets, apparel shops, food service establishments and offices.

Learn the outlook

Another of its highly successful regional meetings was held by the Electrical Contractors Division of the Bureau of Home Appliances of San Diego County recently in Escondido. Neville Baker presided over an excellent program, featuring Ralph Bach, insurance broker of San Diego, Gordon McNary, San Diego Trust & Savings Bank, discussing the financial outlook, and Ralph Rohrbach, distributor and zone governor of NAED. Charles Bratton, Helix Electric Co., served as master of ceremonies and arrangements were made by Al McCutcheon, contractors coordinator. . . The bureau is preparing to celebrate its 25th anniversary Sept. 26 at the El Cortez Hotel, San Diego, with a special program.

New group

Arizona Independent Electrical Contractors Assn. recently named Sam Woodburn of Mesa, Ariz., president. It too is participating in the Housepower program of the two utilities in the state.

Outside inspection discussed

Arizona Chapter, IAEI, elected Paul Davison as its chairman. He is the electrical inspector of Mesa. Other officers are Cecil Clark of Tucson, first vice-chairman, George Raudebaugh of Flagstaff is second vice-chairman, John Wark, Board of Fire Underwriters, third vice-chairman and L. E. Waggoner, Arizona Public Service, secretary-treasurer. The chapter also decided to move officers up by regular progression. Meeting dates for the future were set. On Sept. 14 the chapter meets at Safford. On Nov. 4-6 the Southwestern Section meeting will be held in Phoenix. The Jan. 11 meeting will be held at Chandler, the March 8 at Avondale, and the May 10, 1958, at Flagstaff. An idea to provide fee inspection service for projects outside of areas where regular inspection is available was discussed, but no action was taken. Informal service of this kind is carried on occasionally. It was feared that the establishment of such a service would delay the passage of a state-wide inspection bill.

Date

Electrical Contractors Assn. of B. C. will hold its sixth annual conference at Mission in the Frazer Valley on Aug. 2-3. J. R. Dooley, secretary, is making the arrangements.

Teach why

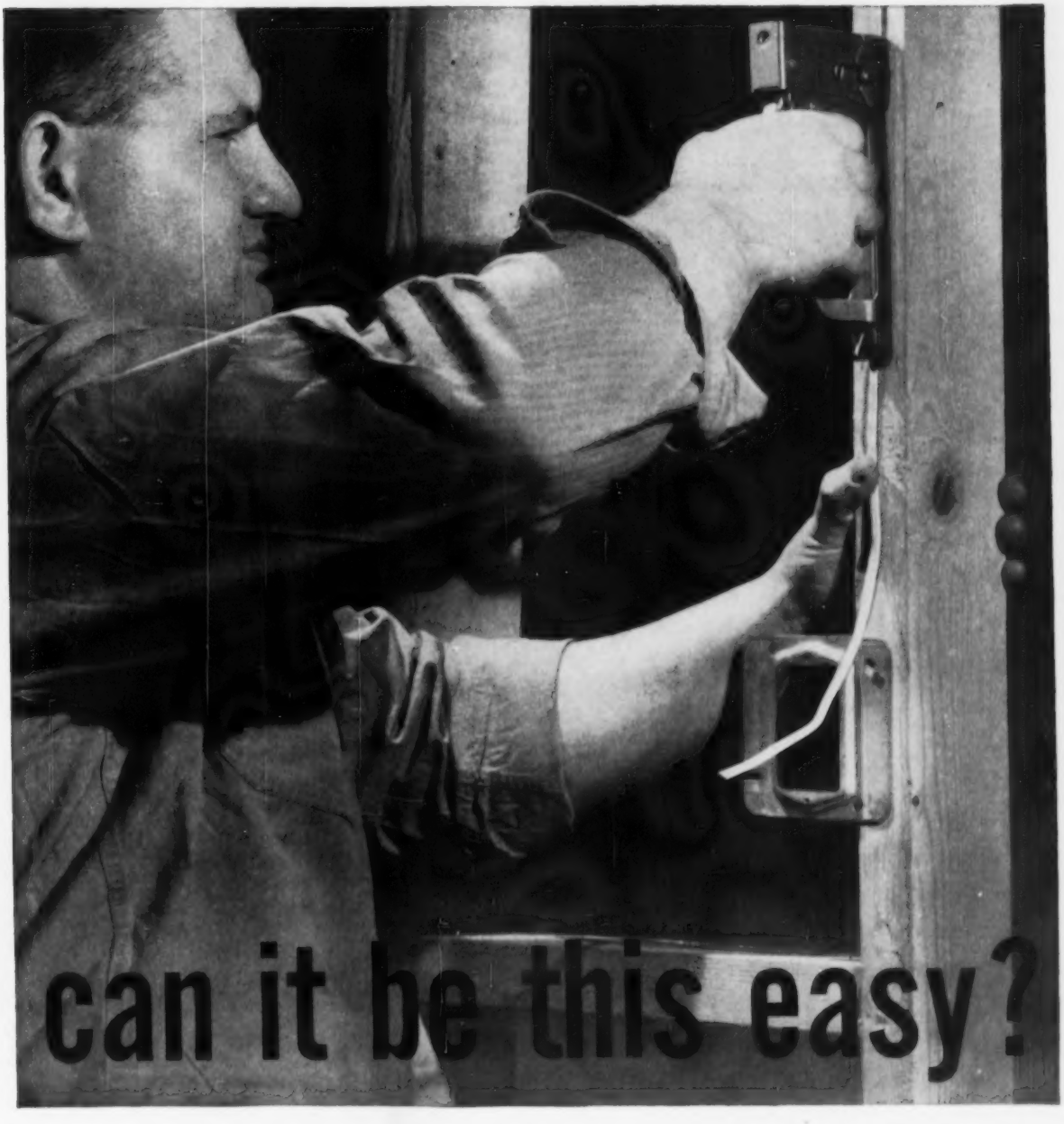
Farmpower Wiring is the title of a new bulletin by the Farm Electrification Committee of the University of Idaho to give farmers and contractors doing farm wiring installation the fundamentals necessary both for an adequate and a safe installation of distribution to the various outbuildings and home from a main farmstead yardpole where the meter is located.

Taking hold

Results in the first 12 months of the Housepower and time-financing program at Montana Power showed 1,586 plans for modernization made by the company, 1,113 of which resulted in installation. Some of these were financed under FHA loans but 318 were financed under the Montana Power time-pay plan for a total of $92,337, an average of $290 per job. The plan was in operation in only five of the seven divisions of the company. Housepower forums were being conducted throughout the system. A three-day session to train six instructors in the six divisions of the forum was held in Great Falls to begin the program. Clarence Kommers, supervisor, heads the program for D. D. McGonigle, general sales manager.

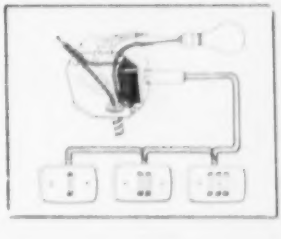
Decide to settle

Newbery Electric Corp. of Los Angeles, one of the nation's largest electrical contracting firms, has established a permanent office branch in Richmond, Calif., at 748 S. 17th St. Marvin Muus is division manager and Bob Ingersoll division superintendent. Both men have been handling the Newbery contract on the Richmond-San Rafael Bridge.



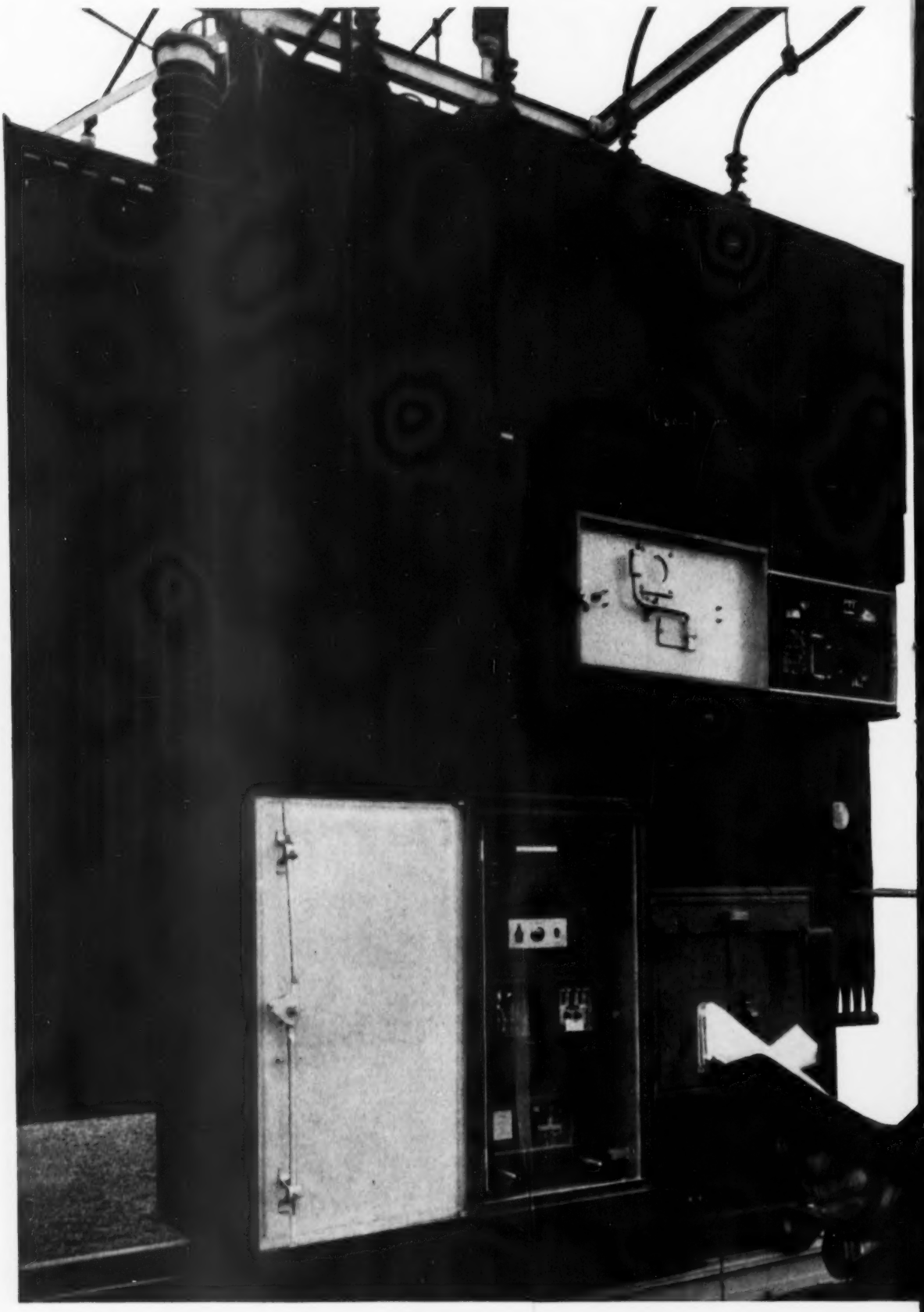
Yes! REMCON takes the work out of switch-leg work

Instead of tugging cumbersome armored cable, you simply staple bell wire from the REMCON relay to the switch. You use only light No. 18 wire that's easy to handle and strip. The time and materials saved mean more money in *your* pocket. For every switching job...from 3-way switching to a complete basement-to-attic remote control installation...reach for REMCON wiring devices.



REMCON, a division of Pyramid Instrument Corp., Lynbrook, N.Y., manufacturer of the famous AMPROBE snap-around volt-ammeter.

WEST COAST REPRESENTATIVES: Allied Industries, Los Angeles; F. M. Nicholas, San Francisco; Northwestern Agency, Portland & Seattle



"Each and every component good as new ... after four years' continuous service,"

reports Pennsylvania Electric Company

"After four years' service—and more than double the operations of a normal between-inspections period—every component was like new in this Westinghouse URS regulator," states Mr. Frank Bartlett, Jr., maintenance foreman of Pennsylvania Electric Company.

Experiences like this back up 20-year contact-life warranty on URS regulators

"When we opened this Westinghouse URS voltage regulator after four years' continuous service, we found each and every component as good as new," states the maintenance foreman at Pennsylvania Electric's Sayre-Waverly Substation. "Contacts still in perfect operating condition.

"With as many as 100 operations per day," he continues, "this equipment delivered continuous trouble-free service. The Westinghouse URS regulator eliminated the constant adjustments, necessary to prevent drifting, which were required for the regulators we formerly used. Maintenance is extremely low."

He adds, "Complete dependability under constant service, long, trouble-free life, ease of adjustment, and stability in delivering constant voltage make the URS regulator a major factor in guaranteeing customer satisfaction.

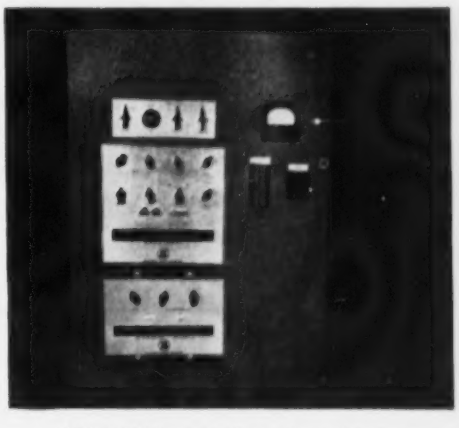
"The 'inside story' revealed when we inspected the unit, gives us complete confidence that this regulator will perform its exacting job . . . for a long time to come."

And now . . . a new concept in precise voltage regulation . . . the URS regulator is equipped with Magamp® (magnetic amplifier) control. Standard for URS and URT load tap-changing equipment for both station step regulators and power transformers. Magamp has no moving parts, no need for mechanical adjustments, no maintenance. All settings—band width, balance voltage, line-drop compensation—are made electrically. This is one of the features assuring still longer life of URS regulators, better voltage regulation.

For all the facts concerning URS voltage regulators, call your Westinghouse representative . . . or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70807

YOU CAN BE SURE... IF IT'S Westinghouse

In this recent announcement, Westinghouse offers a 20-year prorated warranty on contact life for URS regulators with inspection of contacts extended to 10-year intervals.



Behind this control panel are the economy of maintenance-free Magamp and the unmatched speed and smoothness of Geneva gear tap changing—exclusive with URS and URT voltage regulators.

Engineers: Holmes & Narver, Inc.
Los Angeles, Cal.

Contractor: Newbery Electric Corp
Los Angeles, Cal.

22 Acres of Custom-Engineered Lighting by HOLOPHANE

In the great new Douglas Aircraft Plant at Long Beach, California, you can see clearly for more than 1000 feet – with a high degree of visual comfort.... Reason: the lighting is produced by 5767 Holophane Prismatic HIBAY* reflectors... to our knowledge, the greatest accumulation of controlled illumination under one roof!

Holophane luminaires had been used by Douglas for many years ...The decision to install them in this new plant was another endorsement of Holophane lighting superiority.

Through research and development Holophane engineers are discovering new and better methods to meet the lighting problems of the nation's expanding industries. Chances are, they can help solve your problems, too. You may consult Holophane, through architects and engineers, without obligation.

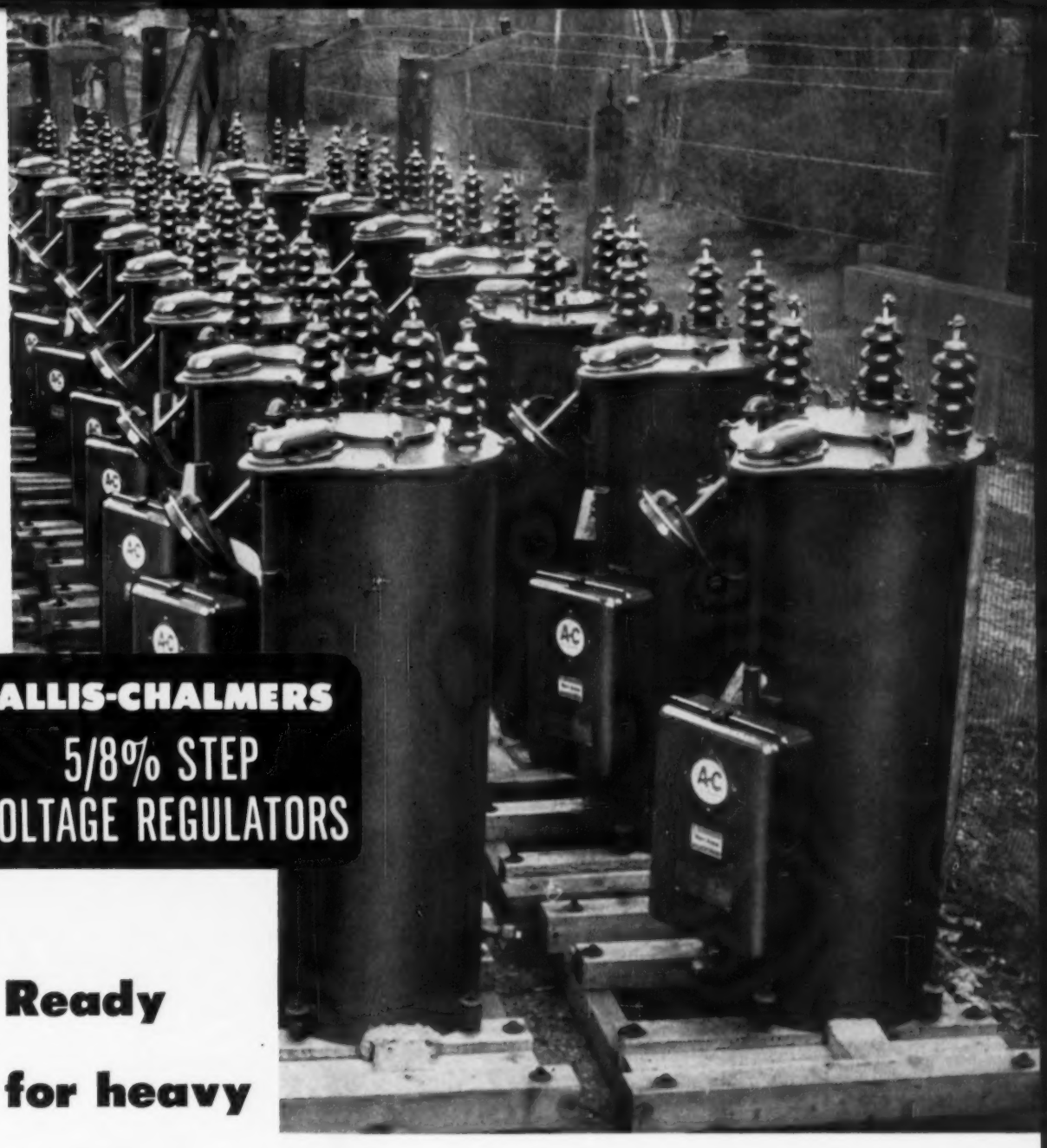
*®

Typical Holophane HIBAY Reflector

To be sure of quality in Reflectors look for the name HOLOPHANE impressed on each piece.

Holophane

HOLOPHANE
COMPANY, INC. • *Lighting Authorities Since 1898*
342 Madison Ave., New York 17, N.Y.
THE HOLOPHANE CO., LTD., 418 KIPLING AVE. SO., TORONTO 14, ONTARIO



ALLIS-CHALMERS

5/8% STEP VOLTAGE REGULATORS

Ready for heavy summer loads!

As you can see, this power company is prepared for increased summer load requirements caused by irrigation, air conditioning and other cooling equipment. By now these Allis-Chalmers regulators are probably in service ready to correct low voltage conditions, prevent revenue losses and customer complaints.

An important feature of these regulators is *Vari-Amp*. With *Vari-Amp*, range of regulation can be reduced . . . current carrying capacity increased as much as 60% without changing either the regulator or the wire size.

Field Stocks

Field stocks of Allis-Chalmers regulators provide fast delivery to meet special requirements. For complete information, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

ALLIS-CHALMERS

A-5454

LIVE BETTER
ELECTRICALLY

lasts and lasts and lasts...

TELLURIUM LEAD ALLOY SHEATH ADDS YEARS OF LIFE TO ROEBLING PAPER POWER CABLE

Roebling Tellurium Lead Alloy Sheath was developed *specifically* to meet the greater stress requirements of today's high loadings and increased operating temperatures.

And it does just that, with its—

4½ Times Greater Bending Fatigue Resistance over ordinary sheath, even in small bending radii.

Remarkable Creep Resistance—actually creeps 90% *less* than ordinary sheathing!

Outstanding Heat Stability—no change in structure or properties after treatment at 400° F.

Negligible Age Hardening—stays "young," ductile, for years.

Resistance to Vibration Fatigue—withstands punishing road vibrations.

Combine these features with superior quality *Roebling Paper Power Cable*, and you can see why more and more companies look to Roebling for cable that lasts . . . and lasts!

Interesting technical data regarding the special properties of cost-saving Roebling Paper Power Cable with Tellurium Lead Alloy Sheath are available from Electrical Wire Division, John A. Roebling's Sons Corporation, Trenton 2, N. J.

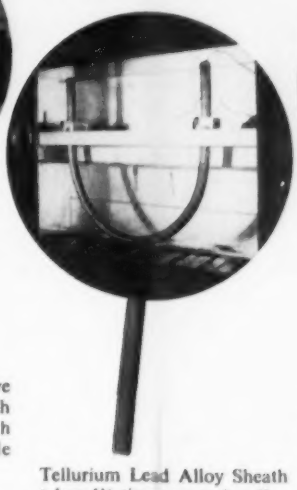
ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

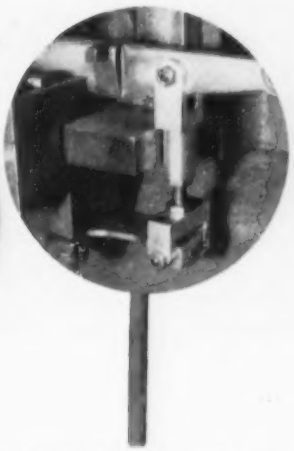
Roebling Paper Power Cable with Tellurium Lead Alloy Sheath is available with either copper or aluminum conductors.

Accelerated life tests prove Tellurium Lead Alloy Sheath far exceeds ordinary sheath in standing everyday cable stresses.

INTENSIVE TESTS PROVE UNUSUAL SERVICE QUALITIES



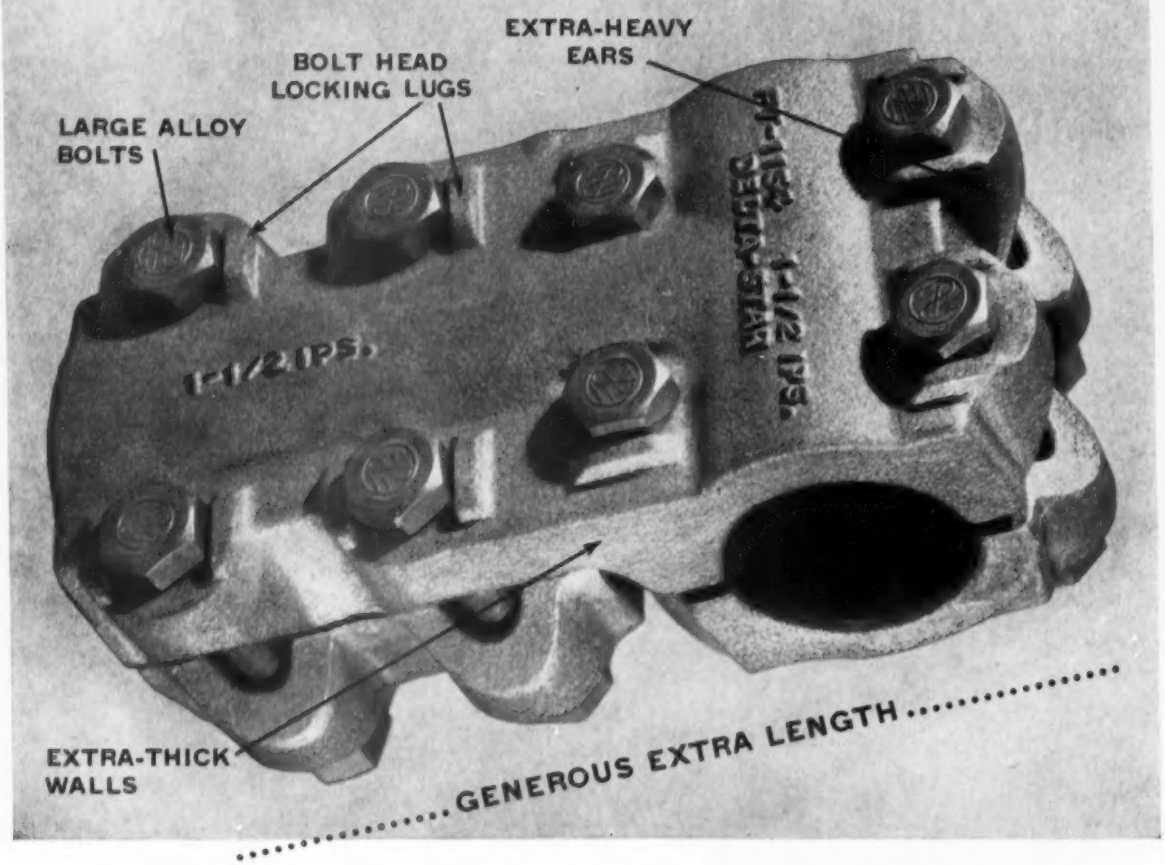
Tellurium Lead Alloy Sheath takes 4½ times more bending than copper lead alloy sheath under identical test.



Roebling Tellurium Lead Alloy Sheath shows its long-term resistance to effects of road vibration in a high-frequency test machine.

Roebling Tellurium Lead Alloy Sheath has 90% less creep than ordinary sheath as proved over extended periods in test ovens.

New..Delta-Star Heavy Duty Aluminum Connectors!



Delta-Star announces a complete new line of connectors. Extra rugged construction and engineered for maximum service life under all conditions... Particularly important in this new line are the heavy walls and generous overall dimensions. With these features pressure is distributed to permit optimum contact yet with negligible cold flow...All sizes and ranges of conductors are cast on surface of each connector...Can be supplied in types and sizes to meet all connector requirements. For further information, write Delta-Star Electric Division, H. K. Porter Company, Inc.—2437 West Fulton Street, Chicago 12, Illinois.

District Offices in Principal Cities

DELTA-STAR ELECTRIC DIVISION
H. K. PORTER COMPANY, INC.

Divisions of H. K. Porter Company, Inc.: Connors Steel, Henry Disston, Quaker Rubber, Leschen Wire Rope, Refractories, W-S Fittings, Delta-Star Electric, Riverside-Alloy Metal, Vulcan Crucible Steel and H. K. Porter Company (Canada) Ltd.

Med Ilch, Idaho Power, general conference chairman, standing, with Al Krieg, NELPA executive manager, T. W. Fryou, Portland General Electric, who responded to welcome extended by E. H. Johnsmeyer, Idaho Power, far right

NELPA accountants account for everything

From Electronics to Fringes

Electronic accounting, central accounting facilities for utility companies, staff problems and employee training dominated the general sessions of the Accounting & Business Practice Section Conference of the Northwest Electric Light & Power Assn. in Sun Valley, Idaho, June 20-22. In the two parallel sessions running all day, June 21, many details of general accounting procedures, practices and experiences in the customer accounting field were aired through panel discussions and individual presentations.

M. M. Ilch, Idaho Power Co., section chairman, called to order the 32nd annual conference of the section. E. H. Johnsmeyer of that company, who headed the arrangements committee, welcomed the delegates on behalf of Idaho Power Co., host company for the meeting. Response by T. W. Fryou, treasurer of Portland General Electric Co., stressed the important role that is played by accounting departments in utility company operations, and the necessity for them to be equipped to supply management quickly and accurately with the data it needs to chart successfully the course of the company. Al Krieg, executive manager of NELPA, gave a report of current NELPA affairs and presented a challenge to the accountants for them to help present more effectively the story of the tax-paying investor-owned utilities. He stated that a good slogan for everyone to adopt, particularly the accountants, should be: "I'll take less from the government if the government will take less from me."

Harold Abramson, Puget Sound P&L, chairman for the customer accounting session, and Ed Duffy, Montana Power, general accounting session chairman

George T. Trexler, manager of public utilities department, IBM Corp., New York City, led off the technical part of the program by discussing the use of electronics equipment for accounting purposes, suggesting recommended uses and benefits to be derived from use of such equipment.

Later in the session, John King, Puget Sound Power & Light Co., moderated a panel discussion on employee training and staff problems, with W. A. Mann, B. C. Electric Co., Clarence Caulfield, Washington Water Power Co., and Harry Clark, Portland General Electric, serving as panel members. Harry Clark pointed out the importance of accountants being afforded the opportunity to take part in civic activities. He said this serves a dual

purpose; it makes the company become more a part of the community and at the same time makes the employee feel more a part of the company.

Ted Fryou, treasurer of Portland General Electric, wound up Thursday's general session by discussing the benefits of liberalized depreciation, while pointing out the precaution that need be considered when it is being utilized.

The other general session was held on Saturday morning. It included a panel on central service facilities, headed by Jerry Harrington, Montana Power, a presentation on rural line extensions by Darcie White, Utah Power & Light Co., and a discussion on financial and operating reports led by Allan Elder, Washington Water Power. The Saturday morning session was wound up by a report on the progress toward installation of a Datatron computer at Pacific Power & Light by George MacKenzie of that company.

General Accounting

Ed Duffy, Montana Power, serving as section chairman of general accounting session, opened the Friday morning session by calling on Jim Cawlfield, Pacific Power & Light, who delved into the currently important subject of construction accounting. Along the same line, J. L. Staines, Portland General Electric, served as moderator to lead a panel discussion on budgets and budget controls. Serving on the panel was Tom Ness, California Oregon Power Co., Emil Jensen, Puget Sound Power & Light, and Howard Blom, Idaho Power.

Jack Purves, B. C. Electric, ably presented the subject of stores accounting, and Hal Gardner, California Oregon Power, followed with a lively panel discussion of banking. Closely allied to the banking problem is the method of handling accounts payable, a subject capably covered by Jack Jones, California-Pacific Utilities Co.

In the afternoon session, two panel discussions were held. The first panel discussion on plant accounting was led by Len Graham, B. C. Electric, with Bruce Pearson, Pacific Power & Light, Harry Blundell, Utah Power & Light, and Jack Lewis, Idaho Power, as panel members. The other panel was moderated by John King, Puget Sound Power & Light, on the subject of fringe benefits, with Walter Jorgenson, Montana Power, R. R. Tweedie, B. C. Electric, and Karl Stott, Utah Power & Light, participating as panel members.

J. E. Anderson, Puget Sound P&L, general chairman for the Sun Valley meeting

Ed Wildfong, Portland General Electric, presented a paper on economics, which dealt with the difference between cost and value of property, and pointing out how the accountant can make a real contribution with his familiarity of the accounting system and cost figures. Franklin H. VanPelt, California Oregon Power, closed out the general accounting session, presented a paper on forms control, which stressed the point that proper forms control can cut down needless paper work, which amounts to more productive time per employee.

Customer Accounting

Harold Abramson, Puget Sound Power & Light, presided over this session devoted to customer accounting, introducing a panel on cashiering and collecting, with Ted Press, Utah Power & Light, as moderator and Alfred Gleason, California Oregon Power, Bill Bordal, Portland General Electric, and Vince Burns, Puget Sound Power & Light, as panel members. This panel discussion was followed by a presentation on post card billings by Alfred Gleason.

In another panel in the morning session, W. T. Freitag, Pacific Power & Light, moderated a session on budget billing, with Vic Jones, B. C. Electric, Jerry Harrington, Montana Power, and Carl Johnson, Washington Water Power, participating. Vince Burns, Puget Sound Power & Light, presented a paper generally favoring centralized customer deposit and meter records.

In the afternoon, Earl Arthur from Montana Power as moderator presented a panel discussion on meter reading, with R. M. Longmuir, B. C. Electric, Alfred Gleason, California Oregon Power, and J. J. Gauger, Portland General Electric, serving as panel members. Harold Abramson, Puget Sound Power & Light, in making a presentation of bi-monthly billings, was of the firm belief that this billing method will contribute to improving the net income.

Internal auditing took the spotlight in the customer accounting session, with Moderator Everett Smith, Washington Water Power, leading panel discussion members, Rodney Colton, Portland General Electric, Eldo Halliday, Utah Power & Light, and A. H. Crow, Idaho Power. The final presentation of the afternoon was on the subject, "Methods of Handling Service Applications and Information from New Customers," by panel discussion headed by Myrvyn Cook, Portland General Electric, with Ralph Lawlor, Pacific Power & Light, Donald Nelson, Washington Water Power, and Sam Dodson, Idaho Power, serving as panel members.

The conference closed with a short business meeting at the luncheon on Saturday. At this session, the nominating committee headed by Ralph Lawlor, Pacific Power & Light, presented a report which was unanimously approved, to recommend J. E. "Ed" Anderson, Puget Sound Power & Light, to be chairman of the section for next year, and Harry C. Donaldson, Montana Power, to be vice-chairman. It was determined that the 1958 meeting would be held in Seattle, Wash., with the 1959 meeting to be held in the territory of Montana Power Co.

Social events of the conference included the banquet and entertainment Thursday night, the get-together coffee party for the ladies Wednesday morning, a breath-taking ride on the Sun Valley chair lift and two luncheons for the ladies on the terrace of the Sun Valley Lodge, one on Thursday and one on Saturday, while the men were closing out the business conference.

NELPA Annual Meeting

NELPA's 50th annual meeting is scheduled to be held at the Glacier Park Hotel, Glacier National Park, Mont., Sept. 5-6. All members received preliminary announcement early in July, according to Al Krieg, executive manager.

The program is taking shape under the direction of E. M. Naughton, Utah Power & Light Co.

APPLIED RESEARCH "Demonstration streets" at General Electric's Hendersonville, N.C., plant permit study of lighting problems on all classes of streets, under all light sources, and for different pavements. Here, Justin Peterson, manager of advance engineering, supervises a light measurement reading of a mercury vapor system on the "main business" street.

You get the results of continuing research in every General Electric street lighting system

Your new General Electric street lighting equipment resulted from yesterday's G-E research findings. And your benefits from today's research will show in even higher quality lighting soon.

Highest value for your street lighting dollar is assured by industry's newest and most complete laboratory, development, and proving facilities. For example, you can compare equipment light output and distribution from the work of a fully equipped photometric laboratory.

On four full-sized demonstration streets, application experiments are carried on for information on present products and projects for tomorrow. Tests are run for customers, at their request, and a trained, professional engineering staff devotes all its time toward improvements to serve your present and future street lighting needs.

Continuing research by General Electric has made major contributions in available equipment and future tools to better serve your public lighting program.

VISION-ENGINEERED SYSTEMS

Let G.E. help your street lighting program on a *vision-engineered system* basis. On every lighting project, regardless of size or type, General Electric offers you, in addition to research and development leadership:

PROJECT RESPONSIBILITY—one source of supply for *all* your street lighting needs. This includes full lines of filament, mercury, and fluorescent luminaires, and a complete selection of control and auxiliary equipment.

COMPLETE APPLICATION ASSISTANCE—expert start-to-finish aid from field and factory lighting specialists.

Get the full *vision-engineered system* story from your nearest Apparatus Sales Office or authorized agent! General Electric Co., Schenectady, N. Y.

LIVE BETTER ELECTRICALLY

452-170

VISION-ENGINEERED STREET LIGHTING SYSTEMS

GENERAL ELECTRIC

president. D. J. McCaig of the Montana Power Co., Butte, is handling preliminary arrangements and Maxwell Wood of Schwager-Wood Corp., Portland, has been appointed to head the committee of manufacturer and jobber members who will provide entertainment.

The program for the meeting will be somewhat similar to that of recent years, in which general sessions will be filled with speakers of national prominence on timely issues affecting the industry, and a day of parallel section-planning meetings. Theme of the meeting is "Thinking Big—Planning Better." Principal business of the meeting will be the election of officers for the year 1957-58.

Planning for the section conferences for 1958 has been given an early start by the appointment of section chairmen, and the firming up of meeting places and dates. The Engineering & Operation Section, with R. P. "Dick" Mortell, Puget Sound Power & Light Co., chairman, will meet first on April 23-25 at Yakima, Washington. Meeting with that section will be the Personnel & Safety Section, under D. M. Pritchett, California-Pacific Utilities Co., and the purchasing committee in the hands of Tom Miksch, Pacific Power & Light Co.

Business Development will go to Great Falls, Mont., May 19-21. Otto Zwanzig, B. C. Electric Co., is section chairman.

Other groups meeting with the section will be the public relations and advertising committee, with G. L. "Gib" Stanton, Idaho Power Co., as chairman and the rate research committee under J. A. Polson, B. C. Electric Co.

The Accounting & Business Practice Section has named J. E. "Ed" Anderson of Puget Sound Power & Light Co. to take the chairmanship of this section in the place of J. R. Sullivan, Montana Power Co., who died recently. Harry C. Donaldson, who was named treasurer of the Montana Power Co. in Mr. Sullivan's place, has been named section vice-chairman, so that he will take his turn in the chairmanship the following year. The June 1958 meeting of the section will be in Seattle.

Electrical Clubs

Los Angeles Electric Club closed its year June 3 with election of Richard L. Engel, district manager of Allis-Chalmers Mfg Co., as its new president to succeed George Larsen of Larsen-Hogue Electric Co. First vice-president is William B. Meek, Westinghouse Electric Supply; second vice-president, George N. Hawley, vice-president of Southern California Edison; third vice-president, T. M. Blakeslee, Los Angeles Department of Water & Power. Secretary-treasurer is Albert W. Tracy, Anaconda Wire & Cable Co., sergeant-at-arms is L. Dean Fowler.

San Mateo Electric Club closed its very successful first year of existence with an election of new officers for the coming year. This club maintains its meetings throughout the summer months. Elected on July 2 were Sil Chaippari, National Electric Supply Co., San Francisco, as president; Mike Wright of Ets-Hokin & Galvan vice-president; Robert Frank, Peninsula Electrical Contractors Assn., secretary-treasurer; and Don Pors and Carl Porter as directors. President during the past year has been Tom Savasta, Savasta Electric Supply.

Electric Club of Oregon heard Dr. Derrol Pennington, director of cathode ray tube department, Tektronix Inc., at its June 13 meeting, held before the final golf tournament and stag later in the month. Jerry Collins is president. Winners of the Electric Club's annual high school scholarships were honored at

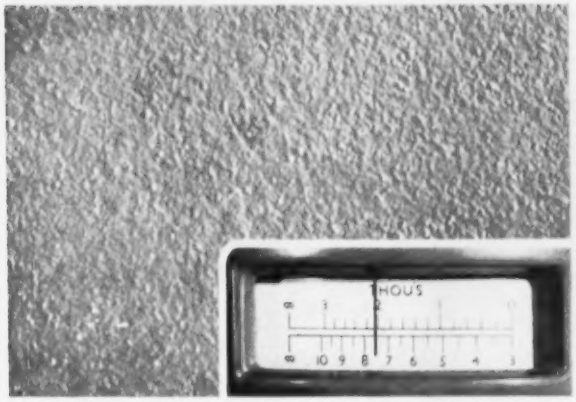
When Los Angeles Chapter, NECA, held open house and a general dinner meeting to inaugurate its new building and offices at 2408 S. Broadway, Los Angeles, some 300 guests attended. Among these were city officials, IBEW representatives, members of all segments of the industry. Dr. W. Ballentine Henley, member of the Los Angeles Board of Water & Power Commissioners, was the featured speaker. In the picture above are Lloyd Gates and Jerry Allen, Department of Water & Power, Andrew Hannon, president of the Los Angeles Chapter, H. E. Tanne, contractor member, and John Strickley, Los Angeles Technical Trade School. The chapter occupies 4,000 sq ft of its 44,000-sq-ft building, the remainder being leased to a drapery distributor

Murry Wolz, Denver fire prevention chief, gave Rocky Mountain Chapter, NECA, fuel in its fight to restore an all-metal code in Denver at a recent chapter meeting. Harris Steel, Reliable Electric, chapter president, seated at right, above

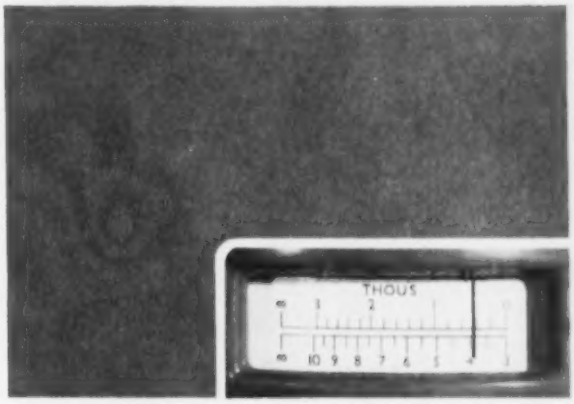
Tests Prove Kuhlman "HOT PAINT"

flows on smoother, gives better coverage

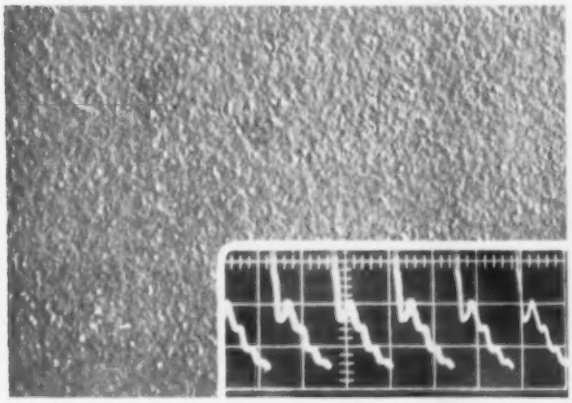
ORDINARY TRANSFORMER FINISH

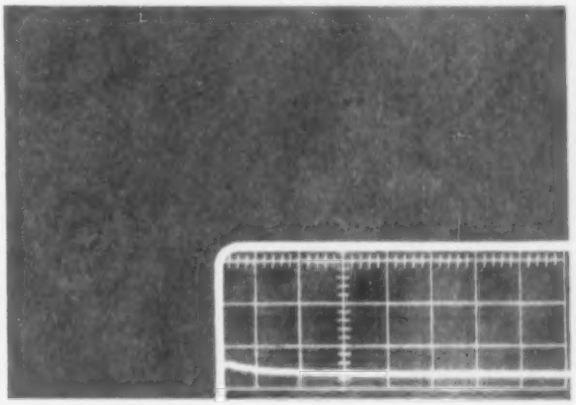


KUHLMAN "HOT PAINT" FINISH



The above mil guage readings measuring paint thickness, prove that the film thickness of the Kuhlman "Hot Paint" finish is approximately 50% greater.





This is a porosity detector test. Any minute pin-holes in the transformer paint allows the detector to make electrical contact with the transformer tank metal. A signal results (shown on the oscilloscope screen at the left) indicating a porous surface. No signal (Kuhlman "Hot Paint" finish) indicates a non-porous surface.

KUHLMAN "Salesman of the Week"

If you can identify this Kuhlman representative, and are the first one to notify Dept. SA-1, Kuhlman Electric Company, P.O. Box 288, Birmingham, Michigan, you will receive a valuable gift.

Here's the reason why:

Kuhlman distribution transformer finish is uniformly heated before it is applied.

This "HOT PAINT" requires less solvent for a given viscosity and allows more *weather-resistant* paint solids to be deposited on the tank surface. As a result Kuhlman "Hot Paint" covers more evenly—without running, thinning out, or orange peeling. It produces a heavier filmed, non-porous finish that will last longer and cut re-painting costs.

The above tests prove "Hot Paint's" exceptional quality—but we invite you to make your own comparison. Ask your Kuhlman representative to show you the Kuhlman "Hot Paint" finish. You'll see the difference in a glance!

5716 a

KUHLMAN

ELECTRIC COMPANY

GENERAL OFFICES: Birmingham, Michigan

INDIANA STEEL & WIRE CO. MUNCIE, IND.
Crapo Galvanizing
Signs along the lines of Crapo GALVANIZED STEEL STRAND PERFORMANCE
For dependable performance . . . insist upon Crapo Galvanized Steel Strand. Superior tensile strength, combined with long-life, ruggedness and workability, makes Crapo Steel Strand first choice for guys, messenger and overhead ground wire.
The famous Crapo galvanizing process provides dependable protection for the steel, prolongs the expectant life of the strand.
• Low maintenance cost
• Laboratory tested and controlled quality
• Meets highest quality standards
• A size and grade for all practical needs
• Contact your Crapo Jobber Today!
INDIANA
STEEL & WIRE CO., INC.
Muncie, Indiana

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life
EVERSTICK
ANCHORS
For new construction and maintenance —Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.
EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

Calendar of Meetings

August

20-24—**WESCON Show,** Cow Palace, San Francisco

28-30—**American Institute of Electrical Engineers,** Pacific general meeting, Hotel Chinook, Yakima

September

5- 6—**NELPA annual meeting,** Glacier Park, Mont.

8-11—**National Association of Electrical Distributors,** Pacific Zone annual convention, Hotel Del Coronado, Coronado

9-11—**International Association of Electrical Inspectors,** Northwestern Section, Hotel Davenport, Spokane

16-20—**NWPPA** Meter School, Oregon State College, Corvallis.

19-20—**Northwest Public Power Assn.,** Accounting Section, Hotel Empress, Victoria, B. C.

30-Oct. 1—**Edison Electric Institute,** electric systems and equipment committee national meeting, Cosmopolitan Hotel, Denver

October

3- 4—**NWPPA,** Power Use Section, Newport, Ore.

13-16—**Rocky Mountain Electrical League,** annual convention, Broadmoor Hotel, Colorado Springs

November

4- 5—**National Rural Electric Cooperatives Assn.,** Region 9 meeting, Portland

4- 6—**IAEI,** Southwestern Section, Westward Ho Hotel, Phoenix

7- 8—**Pacific Coast Electrical Assn.,** Hawaiian Section, Reef Hotel, Honolulu, T. H.

13-15—**National Conference of Standards,** St. Francis Hotel, San Francisco

the final meeting in May. The club gave four scholarships to preeminent students of Benson Polytechnic High School.

IES

Puget Sound Section of Illuminating Engineering Society heard "All About Ballast" from Joe Hamilton, sales manager, Advance Transformer Co., at its final (June 24) meeting of the year in Seattle.

San Diego IES is now a section instead of a chapter. The section status was granted in May. Frank Lee, district engineer, General Electric Co., large lamp department, Los Angeles, discussed "Current Lighting Trends in South Pacific Coast Area" at its June 6 meeting. A regional meeting of the section and chapter officers was scheduled by Carlton Thompson, regional vice-president from San Diego, to be held at Monterey July 19. This was a briefing session for old and new officers to discuss mutual problems and receive instructions for chapter organization during the forthcoming year, beginning in September.

Southern California Section held its annual joint dinner meeting with the Electrical Maintenance Engineers Assn. June 5. After a study club session on industrial lighting with Sid Meyerson of Ruby Fixture Testing Laboratory as chairman and speaker, Frank E. Montroy, Montroy Supply Co., an authority on signs, spoke on "Color Combinations and Their Selection in Sign and Decorative Lighting." It was announced that the 1957-58 educational committee will offer an advance course in lighting design this fall.

Golden Gate Section held an exceptional meeting in May at San Mateo on traffic safety lighting. Prof. Dan M. Finch, University of California, was moderator of a panel including Henry M. Tilson, consulting engineer; Roy W. Mathews, state highway engineer; James E. Austin, Oakland city electrical engineer; Sergeant Leslie Brennan, Traffic Bureau, San Francisco; William Addison, street lighting engineer, PG and E, San Jose; and David Smith, retail division manager, San Leandro Chamber of Commerce. A traffic safety film, prepared for the Governor's Traffic Safety Conference, was shown and formation of a "Lamp Lighters" club was celebrated.

NECA

An eloquent spokesman against wiring with nonmetallic systems addressed the Rocky Mountain Chapter, National Electrical Contractors Assn., at a recent monthly meeting. Murry Wolz of the fire prevention department of Denver's Fire Department spoke from his own experiences. He declared that the two main causes of electrical fires had been found to be nonmetallic sheathed cable attacked by rodents and overheated motors on heating

systems where the motor had been repaired but the inherent protection removed. Wolz told of many experiences where nails had been driven through armored cable and nonmetallic cable, that installation was careless and often fire stopping was removed to pull the cable through. He told of fires where lightning had hit TV antennas and had set fire to all of the nonmetallic sheathed cable in the house. "Any nonmetallic type of wiring is causing more trouble to fire departments than any other electrical material," he said. Another cause of trouble was the placing of fluorescent lighting in series on a circuit. When the ballast goes bad the resistance is too great to trip the breakers. He said he would like to see all fixtures separated at least two inches from the ceiling or equipped with fuses. He declared that less than 20% of the fire runs made by the department were electrical fires but that the losses from them usually ran more than 30%.

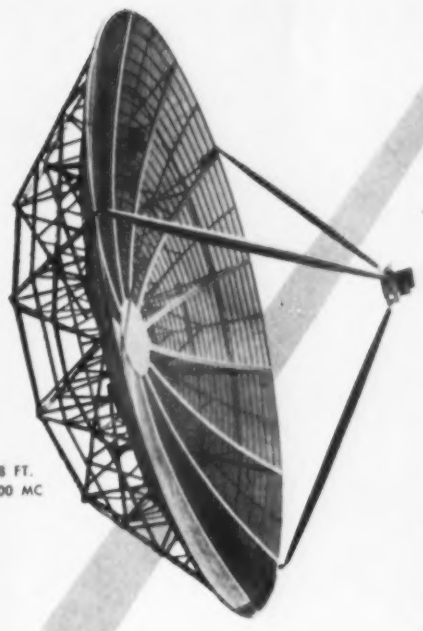
The NECA chapter under Chairman Harris Steele, Reliable Electric Co., announced a new apprenticeship agreement in which there would be two-tenths of 1% reduction in dues beginning May 1. The new apprenticeship text will be financed from the dues and a combination shop and laboratory is being established in the basement of Union Hall where new materials on the market can be incorporated into the training program. It is hoped eventually to have a coordinator in charge of the apprenticeship program. A joint industry board is being proposed in the area.

NWPPA

Northwest Public Power Assn.'s fall meetings include one of the Accounting Section at Hotel Empress, Victoria, B. C., Sept. 19-20 and of the Power Use Section at Newport, Ore., Oct. 3-4.

NAED

National Association of Electrical Distributors Western regional annual convention is scheduled at the Hotel del Coronado, Coronado, Calif., Sept. 8-11, S. W. Mesick, vice-president, and W. M. Jewell, manager, have announced. George Albiez, new president of NAED, is expected to come from Chicago, along with other national speakers. Likewise, arrangements for the 1958 national convention in San Francisco will be discussed and organized.



the Sky's NO LIMIT at Prodelin...

Largest Supplier of Parabolic Antenna Systems for Microwave Communication Services throughout the World

First to pioneer design and manufacture antenna systems for private, commercial and military services, Prodelin is the simple answer to all your difficult propagation problems!

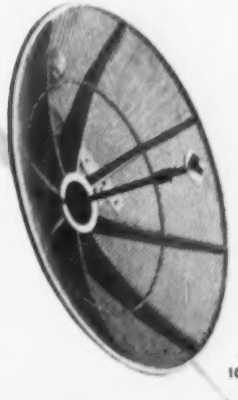
Prodelin produces and stocks a complete line of service-proved antennas in various diameters up to 28 feet, for all types of communication services up to 3,000 megacycles. Services and facilities for any types beyond this frequency range are provided on a custom order basis.

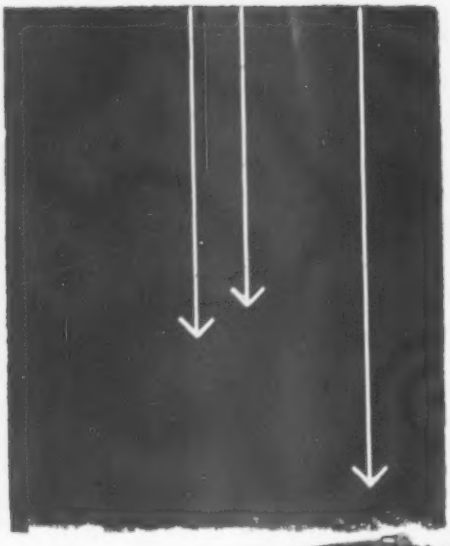
Whether you need ruggedized mesh antenna for high wind load areas . . . or prefer an economical spun aluminum reflector for less critical service conditions . . . or perhaps our latest sectionalized plastic design for low-cost, long-distance bulk transportation . . . or even a *special* design to your specific needs, you can depend on Prodelin parabolic antennas . . . known and used throughout the world in a variety of service applications.

Prodelin is ready to serve you with confidence and experience . . . to recommend reliable service-proved antenna system equipment.

For Prodelin's Complete Line of Parabolic Antennas, Transmission Line, Support Structure, etc. or Information on its Special Design and Manufacturing Facilities, Write: Dept. E. W.

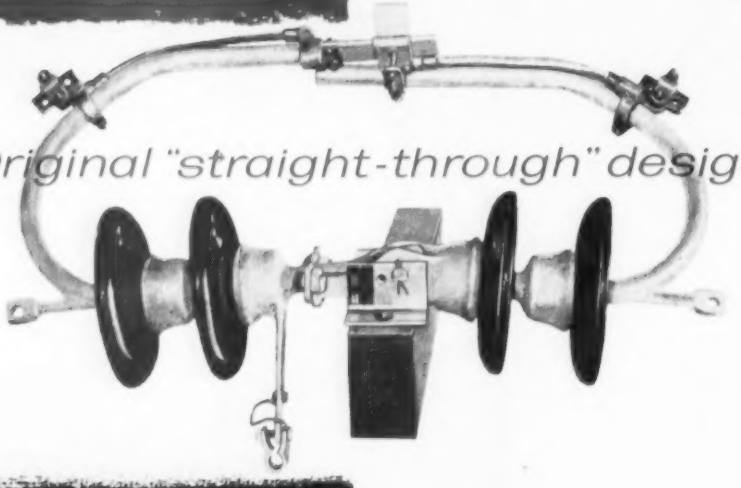
"WORLD'S FINEST ANTENNA SYSTEMS"
Prodelin Inc
KEARNY, NEW JERSEY, U.S.A.





Only KPF switches look like this

simple, attractive, trouble-free, proved in 50 years service



Original "straight-through" design

You always know when a power company is using KPF switches. (As more and more are today). You can't miss the clean, functional "straight-through" appearance of KPF phase units. This same design simplicity that produces pleasing pole top appearance also insures all-weather operating ease. KPF switches have no temperamental mechanisms to malfunction, freeze, lock, need lubrication or wear out.

KPF switches have proved their dependability in over 50 years service on major utilities. Make a test installation of the original, "straight-through" air break switch on your system this month.

Write direct for catalog.

KPF ELECTRIC COMPANY

Dept. W. 1624 E. Alpine Avenue
Stockton 5, California

4264

Portland General Electric tries hand at . . .

Getting Profits from Playgrounds

Spending $250,000 for pleasure—the pleasure of other people—is part of a long-range sales promotion plan of Portland General Electric Co. The thought is a shocker at first, but when you know the background it is a sound dollars and "sense" investment.

The money is being spent to develop outdoor recreation areas in conjunction with the company's hydroelectric facilities.

How does this investment pay off—in dollars? Actually, area development studies made over the years, and in many places, show that conservation improves the "livability" of an area. So, PGE avoids pollution of water; plants grass and trees in areas denuded by hydro construction, to prevent erosion, and takes special care to restore fish and wildlife resources. Livability is preserved, people stay in and are attracted to areas like this, and of course they will be using electricity. If the electricity they use is sold by PGE the quarter-million dollars return home accompanied by a lot of good will.

By adding camp sites, docks, boat launching ramps, stone firepits, tables, community cooking shelters with electric units, toilet facilities and running water, PGE contributes even more than conservation to the livability of the area, and this in turn earns the thanks of thousands of Oregonians who use the free facilities.

How It Started

PGE's entry into the recreation field started many years ago, but the company did not realize it until after the second world war.

In the process of protecting a water right, the company had to acquire a homestead in Mt. Hood National Forest. As it happens, this homestead has a hot spring on it that had been known to early settlers but not so much to subsequent generations. When things began to return to normal after the war, the hot spring was "discovered" again, and began to attract many visitors. PGE placed picnic tables and restrooms at the site and the move gained such favorable response that the whole idea of recreation facilities on company property began to receive serious attention.

About 10 years ago company executives and advisers wrote a conservation policy that cleared the way for more activities similar to the popular Austin Hot Springs experiment. The policy is quoted elsewhere in this article.

As government activity in developing hydroelectric projects began to fall behind demands, PGE, as other Northwest utilities, began expansion of its hydro facilities and the company had its first opportunity in many years to try out its broader concepts of conservation and utilization of resources. Part of this expansion is the Pelton project on the Deschutes River, which received national attention as controversies and litigation caused years of delay. Well under way now, Pelton will have the royal treatment in application of the policy. Between $90,000 and $100,000 will be spent on recreation facilities. The fish-passing facilities and other conservation measures will cost millions more, but the end result will be a beautiful and valuable addition to the economy and livability of the region.

The first application of the policy was at Timothy Meadows where PGE placed a storage reservoir called Timothy Lake. It collects water from the watershed of a stream called Oak Grove, which in turn drains into the Clackamas River. Storage is about 65,000 acre-ft, and the location is about 80 miles from Portland.

Since the reservoir at Timothy Meadows is filled while the Clackamas is in the freshet stage, the lake can be called a flood protection measure. It remains full during the vacation and outing season. Drawdown of the reservoir begins in the

(Text Continues page 147)

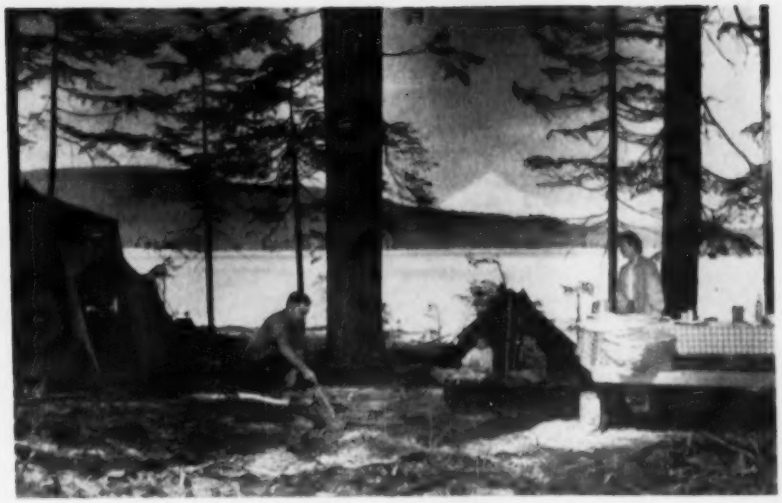
The Policy and What It Brought

IN UTILIZING natural resources for the production of electric energy, Portland General Electric Co. will, in the interests of sound conservation, endeavor to apply to its generation developments those policies which will preserve and make available for general public use and benefit, to the maximum extent that is technologically and economically feasible, all of the multiple values other than power which may be associated with such a development.

To this end, it is the policy of the company to design, construct and operate its projects in such a manner as to avoid the unnecessary wasting or alteration of any natural resource, and if possible to restore or replace in equivalent form resources which are necessarily affected in the process of utilization for power purposes.

Particularly the company will, independently or in cooperation with cognizant public agencies, take adequate and practical means for making its project lands accessible to the public for recreational use and for providing facilities to enhance the enjoyment thereof; for avoiding the pollution of water courses and the atmosphere; for reforestation and revegetation of areas denuded by project construction and for the control of erosion thereon; and for preserving or restoring fish and wildlife resources.

—Portland General Electric Co.



(Text starts page 145)

autumn when the Clackamas can take the water easily and when PGE's station P below the junction of the Oak Grove and the Clackamas needs the water for generation.

Timothy Meadows recreational facilities were planned well in advance with the cooperation of Oregon and federal park and conservation agencies. Construction buildings, for example, were designed and built to serve their primary purpose and then to be converted to park use. Trout was planted in the lake by the state fish and game commission, the U. S. Forest Service laid out the plans for use of the land on the shores of the lake for campgrounds, boat landings, three forest camps and other facilities.

Besides the recreational facilities at Timothy Meadows, PGE leveled the borrow area to a degree that makes it usable as a landing strip for aircraft. The company also built 11 miles of access road to government specifications which was turned over to the Forest Service and made a public highway. To give an idea of the attention to detail that has gone into Timothy Meadows, PGE folks tell about rerouting a favorite hiking trail, called Skyline, that had crossed the reservoir area. And they tell about the trees that were removed in order to give the week-enders a nice view of Mt. Hood.

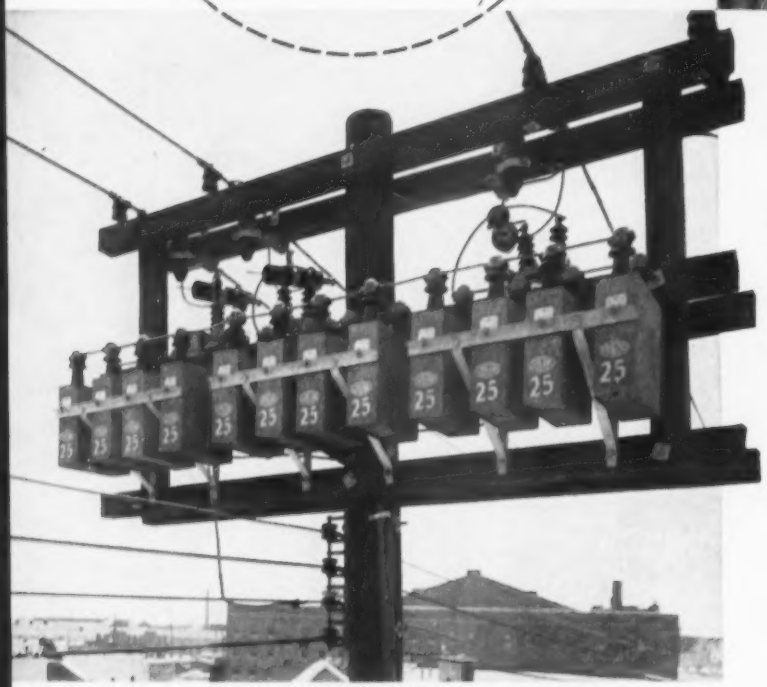
Naturally there are some headaches involved in maintaining and building the nine camp and picnic areas that are complete or under construction. Best witnesses to this are probably Frank Mackaness, PGE's agricultural consultant, who supervises the clearing of sage and rabbit brush for tick control and at the same time supervises reforesting and planting of grass and flowers in the areas.

Another PGE man who is close to the recreational side of things is Jim Goggin, manager of community relations. At the same time he keeps the operation going smoothly for as many as 9,000 people in a single day, he has to worry a bit about the rumble from an uncounted number that arrived too late for a picnic table or camp site.

PGE has a slogan that pretty well sums up the advantages of the conservation policy. It is "Power, Payrolls and Playgrounds." Looking ahead to the time when the $250,000 are back in the till and the company has gained many friends because of its outlook, a fourth word seems appropriate for the slogan—*Prosperity.*

Sangamo
Capacitors
"APPROVED"
by more and more
major utilities!

Dielectric packs are wound of special kraft paper and pure aluminum foil. Atmospheric conditions are controlled to eliminate any danger of contamination.



Constant care in longer service

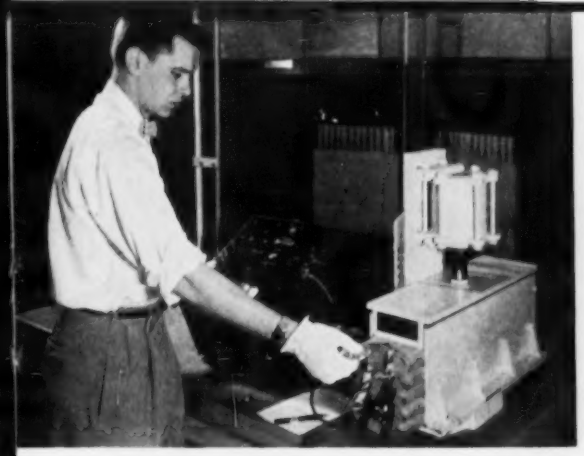
Sangamo Power Capacitors are built to rigid specifications to meet power engineers' requirements for stable performance and long service life.

Rigid quality control of raw materials . . . constant care in every step of manufacturing . . . thorough testing and inspection . . . are all part of these specifications.

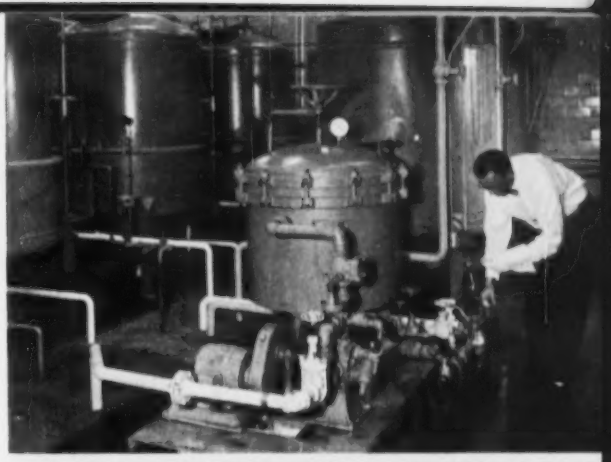
These capacitors are built in one of the country's most modern "controlled conditions" manufacturing plants. Dust is filtered out of the atmosphere to eliminate danger of contamination. Temperature and humidity are controlled to assure product uniformity.

The power engineers of many major utilities have inspected Sangamo's processing facilities, some of which are shown on these pages, and

This bank of 25 Kvar Sangamo Capacitors is controlled by the voltage type Sangamo VC Lincolntrol shown below. The service is 2400/4160 Y grounded neutral with capacitor cases and Lincolntrol tied in with ground.



Specific tests precede and follow almost every processing operation. Here dry rolls are being measured for capacitance and power factor.



Sangamo Diaclor, the liquid dielectric used in these capacitors, is purified here. Great care is taken to maintain its purity.

production means on your lines

have put Sangamo Capacitors on the "Approved List" of their respective companies. Sangamo Power Capacitors are available in 15, 25 and 50 Kvar units, in all primary voltage ratings, and in factory-assembled and wired Auto Var equipments for pole-type installation.

Sangamo also manufactures LincolnIrols and Time Switches for automatic capacitor control as a function of time, volts, amperes, watts, or vars—or as combinations of these functions. Look to Sangamo for all your capacitor requirements . . . visit our plants . . . inspect our facilities. Ask your Sangamo Representative, or write us for complete information.

SANGAMO ELECTRIC COMPANY

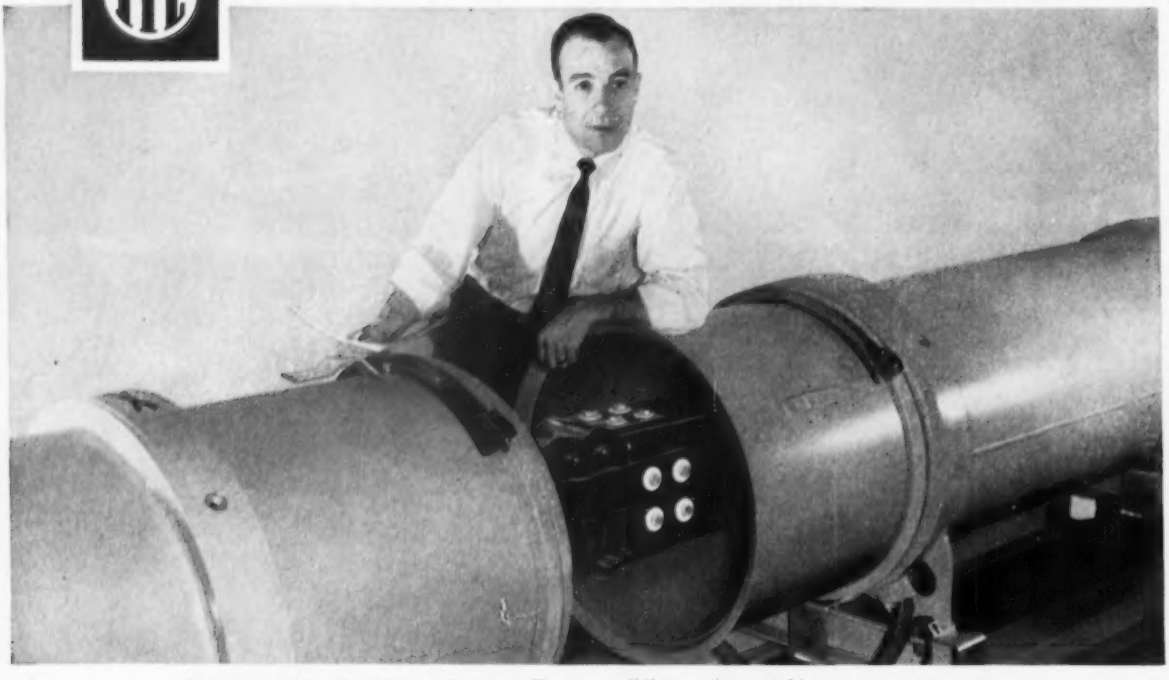
SPRINGFIELD, ILLINOIS

Sangamo's facilities are geared for quantity production. Here is one of the capacitor vacuum impregnating tanks.

Each unit is tested for overvoltage, capacitance, power factor, and radio noise in a completely shielded test booth. Capacitance and power factor measurements are made at rated voltage and frequency with a high-precision bridge.

After final inspection and tests, the completed capacitors come off the assembly lines and are packaged for shipment to you.

ISOLATED PHASE BUS



Typical assembly with sliding section open. Two-way sliding section provides easy access to connectors—simplifies inspection and maintenance—effects savings in installation and operation.

SO MUCH MORE FOR THE SAME MONEY

All isolated phase bus meets industry standards; performs satisfactorily at rated current, voltage and temperature rise, with standard impulse levels; sells at competitive prices. But when selecting isolated phase bus for generator or any other applications, it is necessary to consider cost, *plus* installation and operating advantages. Here are some of the superior inherent advantages of I-T-E Isolated Phase Bus design that are not covered by industry specifications, yet effect substantial savings in installation and operation:

Most Simple and Efficient Design thermally, electrically and mechanically.

Fewest and Most Durable Gaskets, meaning direct savings in installation time and maintenance.

Greatest Installation Flexibility.

Tightest Bus ever designed. Dust and water leakage are eliminated.

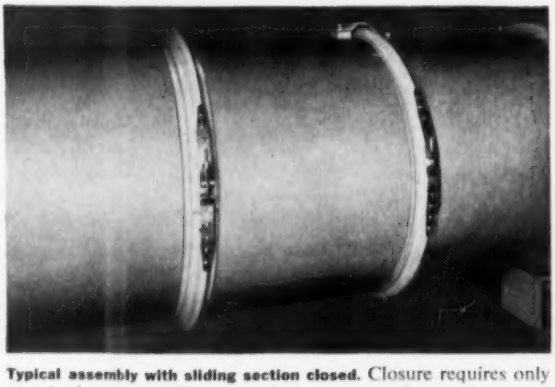
Lightweight. Save in installation time and labor. Also in building steel with supports and hardware.

Sliding Covers. Strategically located to insure stable mounting base for standard length and facilitate joint makeup and inspection when necessary.

Expert Engineering. Backed by more than 20 years' experience in the design and manufacture of isolated phase bus, insures quick, reliable engineering and excellent delivery.

Self-Cooled or Forced Air Cooled in ratings up to 14,000 amperes continuous.

Let us tell you more about I-T-E Isolated Phase Bus and its installation and operating advantages. Write for Bulletins 10004-A and 10004-B. I-T-E Circuit Breaker Company, 19th and Hamilton Sts., Philadelphia 30, Pa.



Typical assembly with sliding section closed. Closure requires only two 1-piece round lifetime gaskets—easy to place and remove. Simple, powerful V-clamp couplings distribute clamping pressure uniformly around ring.

I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division

IN CANADA: EASTERN POWER DEVICES LTD.

THIS MONTH'S NEWS

Los Angeles Plans Dam At Bridge Canyon, Ariz.

Los Angeles Department of Water & Power has applied to FPC for a preliminary permit to construct a $400,000,000 dam and power plant on the Colorado River at Bridge Canyon in Arizona.

The dam would have a storage capacity of 3,700,000 acre-ft and the proposed plant would have a 750,000 kw capacity, almost twice the share of Hoover Dam allotted to Los Angeles.

Construction of transmission lines to carry the power more than 400 miles to Los Angeles would take another $109,000,000.

If the preliminary permit is granted, the department would make studies costing some $750,000 over a three-year period. Construction of the facilities would take another six years, making 1966 probably the earliest the plant could be in operation, according to J. C. Moller, Jr., president of the Los Angeles Water & Power Commission.

• Washington Water Power Co. has started work on a new $200,000 service center near Pullman, Wash., for the company's Palouse division.

1,000-to-1 Chance On Kwh Contest

Contestants who sent in an entry to the publication's annual Kwh Rodeo Contest have a 1,000-to-1 chance to be 500-plus dollars richer next year at this time. The contest closed June 30 with 1,047 entries—each of which predicted what the total kwh output for the 11 Western states will be for 1957.

Announcement of the winner will be made early in 1958 when official Federal Power Commission output figures will be available. Meanwhile, IBM's electronic brain is being put to work to forecast the probable winning figure from data already available. Its predictions will be published in these pages as they are compiled.

Utility Teaches Safety to Youngsters

Arizona Public Service is sponsoring safety clinics for youngsters, with emphasis on safe use of electricity on the farm. Two Yuma 4-H members, Tom Rushin, left, and Tom Loo, give a demonstration of their electrical project that won the state 4-H electrical project championship. Their model is wired to warn against electrical hazards. In the demonstration, man was burned when his boom hit power lines

Electricity From Atoms Used by Edison Company

Electric power was produced for the first time July 12 by heat from the sodium reactor experiment during tests of the nuclear reactor and auxiliary components on Santa Susana Mountain, Calif.

The SRE, designed and built for the AEC by Atomics International, is a part of the commission's program to develop economically competitive civilian power from nuclear energy.

Southern California Edison Co. has installed electrical generating equipment adjacent to the nuclear reactor to convert to electricity reactor heat energy, which the company purchases from the AEC.

The electricity produced was fed over the company's distribution lines. The experiment marked the first time a nonmilitary atomic energy reactor has produced power for the generation of electricity by a private utility company.

Following numerous experiments to test the operation of all components, the reactor plant will be operated at full power late this year. The reactor is designed to produce 20,000 kw of heat from which the Edison equipment will generate approximately 6,500 kw of electricity.

• Construction of a $24,000,000 natural gas pipe line from the San Joaquin Valley to Los Angeles Harbor area will begin as soon as necessary franchises are obtained from cities along the proposed route, according to officials of Southern California Edison Co., Los Angeles. The project will be built by the Edison Securities Co., a subsidiary of Southern California Edison. New gas supplies along the 130-mile line will come from the San Joaquin Valley reserve of the Richfield Oil Corp., as the result of a 20-year agreement signed recently with Edison Securities Co. It will be utilized in Edison company steam and electric generating plants in the Los Angeles Basin. Completion of the line is scheduled for early in 1958. Construction is being protested by Southern California Gas Co., Southern Counties Gas Co. and Pacific Lighting Gas Supply Co.

Spillway Takes Shape at Noxon Rapids

Washington Water Power's Noxon Rapids project is taking on a structural form as work on the spillway section progresses. Noxon Rapids is one of the largest hydroelectric projects ever to be undertaken with private capital in the Northwest. It will have five generating units developing 400,000 kw. Engineering is by Ebasco Services and construction is by Morrison-Knudsen. Cost is about $84,000,000

Revenue Bonds Permitted For Sacramento Expansion

The California Legislature has passed a bill to allow the Sacramento Municipal Utility District to finance expansion of its electric distribution system through the use of revenue bonds.

The legislation limits the issuance of bonds to $10,000,000 a year. SMUD asked for the legislation to "enable the district to proceed in a sound, business-like way without undue hardship on power users in taking care of needed facility expansions."

The bill will prevent use of the revenue bond money for building hydro electric or steam production facilities.

The legislature adjourned June 12 without taking any action on the controversial state water development program, including the $1.5 billion Feather River Project and the $230,000,000 San Luis Project. Failure to pass an appropriation bill bogs down road relocation work already begun toward construction of Oroville Dam, which with its 440,000-kw power plant is a key unit of the Feather River Project. Also defeated was legislation to facilitate federal construction of the San Luis Project to provide for pumping irrigation water to the western San Joaquin Valley.

Chugach Leaves Combine To Build Cooper Lake

The Chugach Electric Assn. has withdrawn from the Central Alaska Power Assn. Cooperative and voted to proceed by itself with construction of the Cooper Lake hydroelectric project on the Kenai Peninsula.

CAPA had been organized solely for the purpose of building the proposed Cooper Lake Dam and power plant. However, the preliminary FPC permit for the project is in the name of Chugach and the board of directors felt that the co-op could build the project faster by itself, said Manager Marlin S. Stewart.

CAPA made a request to REA for a loan to build the project, with transmission lines and substations necessary to serve Chugach, the Homer Cooperative and the Kenai Lake Cooperative.

Montana-Dakota to Buy Power From PP&L Line

Montana-Dakota Utilities Co. has signed a contract to receive power from Pacific Power & Light Co.'s new transmission line running from Casper, Wyo., to Billings, Mont.

Tom Hughes, manager of the Sheridan, Wyo., division of MDU, said the contract provides for 3,000 kw of firm power the first year.

The purchased power will supplement MDU power generated at its steam plant in Acme, Wyo. Hughes said the new power source will eliminate the need of MDU to install additional generating units at its Acme installation.

PG and E to Purchase Canadian Gas Supply

Plans to build a $330,000,000 1,300-mile pipe-line system to transport natural gas from gas fields in Alberta direct to California were announced July 12 by Norman R. Sutherland, president and general manager of Pacific Gas and Electric Co.

Initial deliveries of 400,000,000 cfd are planned for 1960. Line diameter will vary, but is expected to exceed 30 in.

The project will require authorizations of governmental agencies of Alberta and of Canada, of the Federal Power Commission and of the California Public Utilities Commission.

PG and E will be assisted in the design, engineering and construction of the project by Bechtel Corp. The line will cross several mountain ranges, including the Canadian Rockies, and will cross portions of British Columbia, Idaho, Washington and Oregon, terminating at an existing PG and E transmission network station at Antioch.

Operating gas utility companies in southern California, whose gas imports from Texas and New Mexico equal PG and E's, have been offered 50% of the deliveries from Canada.

• **All bids** submitted for construction of Eagle Gorge Dam, federal flood-control project on Green River near Palmer, Wash., have been rejected, Colonel R. J. B. Page, Seattle District Engineer of the Army Engineers, has announced. The action included rejection of the protest of the low bidder, Peter Kiewit Sons' Co., to the adequacy of the government fair-price estimate, which was $4,071,258 below the Kiewit bid of $10,874,360.

New Westinghouse
10 Kvar Capacitor

ADDING 10 KVAR SECONDARY CAPACITORS NOW EASIER THAN EVER

Westinghouse offers a new 10 kvar type FPS capacitor to improve power factor on single phase, 60 cycle, 240 volt secondary systems. Here is a compact, light-weight package that is as safe and easy to install as the smaller 3, 5 and 7½ kvar capacitors which Westinghouse pioneered.

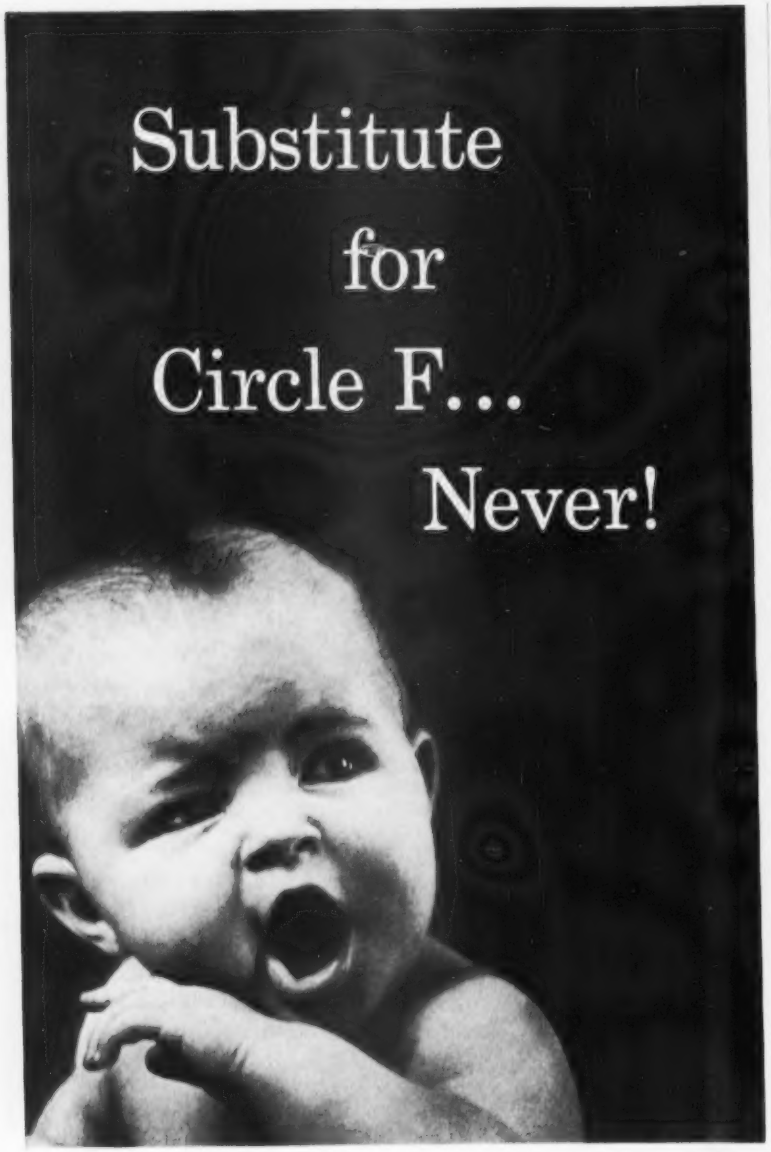
First, the top hanger is fastened to the pole with a lag screw . . . the capacitor with the lower hanger attached is then hung and the lower hanger lagged to the pole. Then simply connect the line leads and the Westinghouse capacitor begins to pay off in increased load capacity, reduced load losses and improved voltage level.

Once you've hung Westinghouse capacitors you can forget them. Thousands of installations have proven the effective seal used with the porcelain bushings. And the lifetime finish of heavy metallic zinc protects outdoor installations indefinitely from weather, rust, corrosion and abrasion.

For detailed information call your Westinghouse sales engineer. J-60930

YOU CAN BE SURE...IF IT'S

Westinghouse



Look no further for wiring devices! Because with Circle F you've never had it so good... in quality and service... and in price, too!

No. 3401
No-KLIK
QUIET
SWITCH

No. 2524
N.E.M.A.
GROUNDING

No. 2515
N.E.M.A.
GROUNDING

GUARANTEED F WIRING DEVICES

Circle F Mfg. Co.
TRENTON 4, NEW JERSEY

UL

For your wire requirements: Eastern Insulated Wire Corp.
Box 591, Trenton, N. J.
A Subsidiary

New Power Committee Advised on Neutrality

At its first meeting at Olympia, Wash., the newly created Washington State Power Advisory Committee was warned both that it "must not fall into the trap of being known as a public or private-power committee" and that it must not spend too much money.

The first warning came from Earl Coe, state director of conservation, whose department the committee was formed to advise. The second came from Gov. Albert D. Rosellini, who cautioned the committee should spend no more than is necessary of $275,000 appropriated to it for studying the feasibility of a proposed steam power-generating plant.

Pacific Power To Build New Wyoming Station

Pacific Power & Light Co. has confirmed a report that it is planning to construct another 100,000-kw steam-generating power plant in Wyoming.

Veryl Hoover, general manager of the company's Wyoming division, said all engineering details for the plant have not been worked out and a definite location has not been determined.

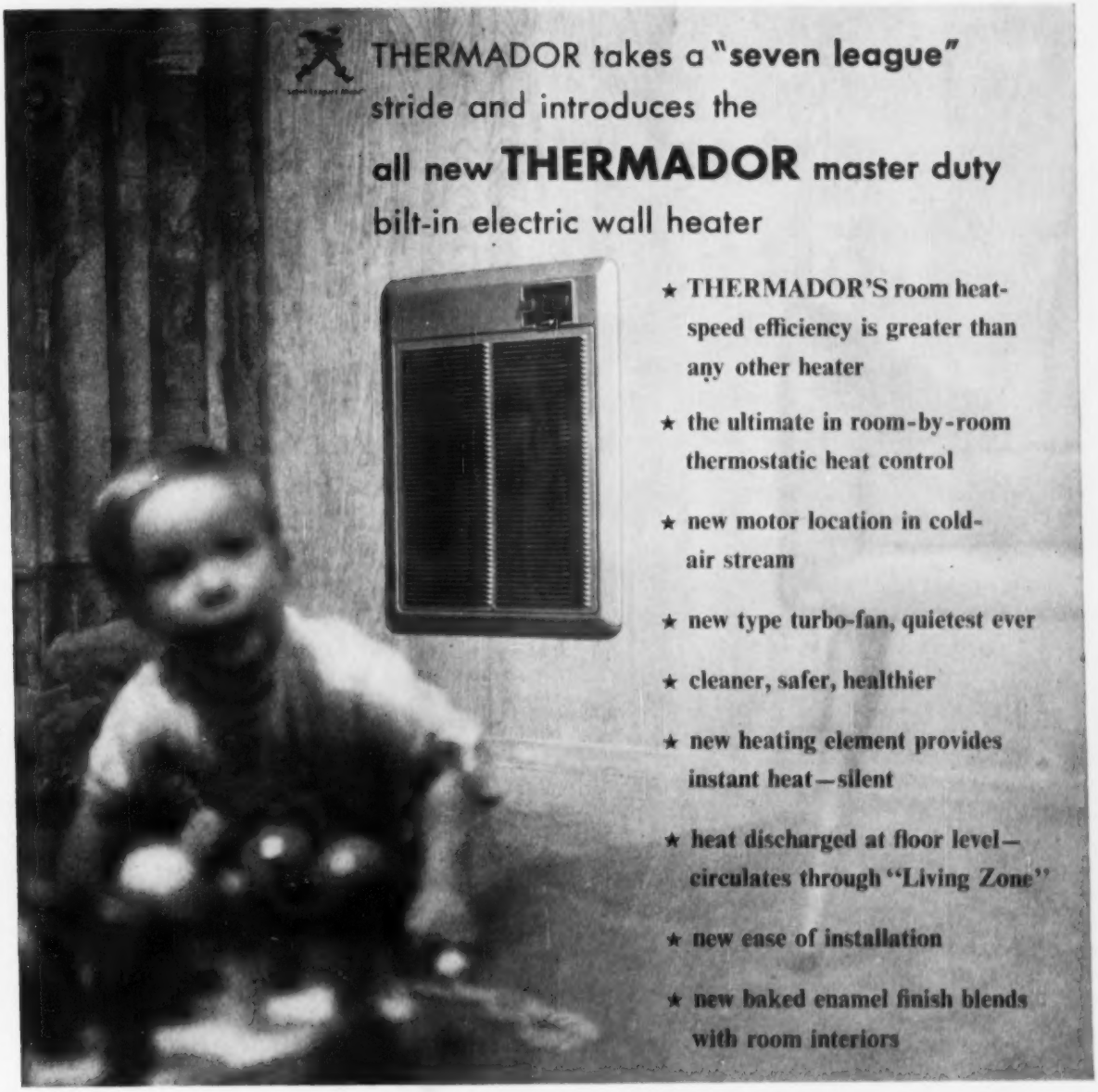
Last June Pacific started construction on a 100,000-kw plant on the North Platte River near Glenrock, Wyo., and the new plant may be erected at the same site.

There are vast low-grade coal deposits around Glenrock and Lake DeSmet that may be utilized.

Fund Shortage Scored By Ice Harbor Builder

The $18,500,000 budgeted for construction of Ice Harbor Dam during this fiscal year is "completely inadequate" in the opinion of H. O. Montag, general manager of the firm that is building the Snake River structure near Pasco, Wash., for the Corps of Engineers.

Construction on the project may shut down by December unless more money is appropriated for the project than is presently planned, said Montag, a principal in the Portland, Ore., combine of Montag, Halverson, Austin & Associates. The figure has been approved by the public works subcommittee of the Senate appropriations committee.



THERMADOR takes a "seven league" stride and introduces the all new **THERMADOR** master duty bilt-in electric wall heater

★ THERMADOR'S room heat-speed efficiency is greater than any other heater

★ the ultimate in room-by-room thermostatic heat control

★ new motor location in cold-air stream

★ new type turbo-fan, quietest ever

★ cleaner, safer, healthier

★ new heating element provides instant heat—silent

★ heat discharged at floor level—circulates through "Living Zone"

★ new ease of installation

★ new baked enamel finish blends with room interiors

There's bilt-in protection with THERMADOR's completely NEW electric room heater that gently circulates clean, safe heat instantly—throughout the "Living Zone." Flush-to-wall installation.

OTHER THERMADOR HEATERS—*Portable Fan-Type and Radiant Heaters; and Bilt-in Radiant Room Heaters.*

MODEL RB

MODEL LR

MODEL PR

MODEL HF

MODEL MHF

THERMADOR

ELECTRICAL MANUFACTURING COMPANY

Division of Norris-Thermador Corporation

5119 District Blvd., LUdlow 8-6131 • Los Angeles 22, Calif.

THERMADOR REPRESENTATIVES:

ARIZONA
M. H. KROEKER
7513 Mesquite Drive, Scottsdale
WH 5-8398

CALIFORNIA – San Diego
JOHN L. MOONEY
1916 La Corta, Lemon Grove
Hopkins 3-3852

CALIFORNIA – North
WILLIAM H. GRIBBLE
610 - 16th Street, Oakland 12
Twin Oaks 3-7716

COLORADO – WYOMING
W. G. CLINE
4500 Kalamath St., Denver 11
Genesee 3-6441

NEW MEXICO
WALTER H. OLIN
5910 Bellamah, N. E.
Albuquerque
Phone: 59165

OREGON
GLENN A. ERBES
1400 Horseshoe Curve, Oswego
Neptune 6-3442

UTAH – IDAHO (So.)
WALTER R. BILLS
211 South 2nd St., Salt Lake City
Elgin 5-7222

WASHINGTON
JOHN R. WEBER
2415 - 42nd North, Seattle 2
Franklin 0997

WASHINGTON – IDAHO (No.)
HERBERT A. WHITNEY
N. 4610 Ash, Spokane 13
Fairfax 5-9851

For information regarding other areas write or call the Los Angeles factory office.

3-11334

when you want

THE FINEST...

Specify Leadlighter!

PATENTED*

TESTED AND PROVED
WHERE IT COUNTS...IN ACTUAL USE!

Five years ago Leadlighter was introduced to the lighting industry as a new solution to the problem of high illumination levels and low brightness. Today it has become a proven design, tested in the best way possible, *by actual use in many large installations.* See it in San Diego in the **National Steel and Ship Building** offices, the **Education Center** or the **County Branch Court** building... in Menlo Park at the **Hublein Distillery Co.**... in Fresno at the **Swift Ave. School**... in Pasadena at the **Pasadena Star News**... in Panorama City at the **Metropolitan Life Insurance Co.**

Leadlighter, with up to 80% efficiency, complete luminosity over the entire bottom of the fixture, and self-cleaning vanes, offers illumination quality not possible in any other fixture.

Leadlighter can do a job for you, too. Call or write us. One of our lighting engineers will be glad to answer all your questions.

LEADLIGHT FIXTURE CO.
800 100th AVENUE, OAKLAND, CALIF.
PHONE SWeetwood 8-7760

*PAT. NO. 2 703 360

Chelan PUD and Alcoa Partners on Rocky Reach

The Chelan County PUD of Wenatchee, Wash., has reached an agreement with Aluminum Co. of America under which the PUD will sell 23% of the power from its Rocky Reach hydroelectric project to Alcoa for its nearby reduction plant. The aluminum company, in return, will pay 23% of all costs of building and operating the project over a 50-year period.

The agreement is contingent upon a provision that final costs, including financing expenses, do not exceed certain limits. This limitation has not been announced but total cost of the project has been estimated at $250,000,000.

Construction now is under way on the first phase of the project.

Alcoa announced that the resultant firming up of its Wenatchee power requirements will be accompanied by a $10,000,000 expansion of its reduction plant by mid-1961, when the first Rocky Reach generator is scheduled to go into operation. The expansion will involve addition of a fifth potline.

Alcoa's share of Rocky Reach generation will include interruptible and dump power, as well as firm. It is expected to total 165,000 kw, including 78,000 kw of firm, 22,000 of high-availability interruptible and 65,000 of combined peaking and dump power. The plant uses about 60,000 kw of interruptible power from the Bonneville Power Administration, which would be partially replaced by 28,000 kw of firm power and 22,000 kw of interruptible from Rocky Reach. The 65,000 kw of peaking and dump power either would be used by the PUD or marketed by the PUD for Alcoa.

Southern Nevada Power Expanding Clark Plant

Southern Nevada Power Co., Las Vegas, will add a third unit to its Clark steam-electric plant, boosting its capacity by 75,000 kw.

The company's estimate on when the new multimillion-dollar unit will be built: between November 1959 and July 1961.

It will increase the utility's generating capacity to 1,450,000,000 kwh a year.

President Reid Gardner said the new unit is needed because drought conditions have reduced the power the utility receives from the Hoover Dam power plant.

Thomas-Quality Insulators and Line Hardware

Pioneer organization expands Delta-Star Line to include electrical porcelains

The Thomas Works of Delta-Star Electric Division, H. K. Porter Company, Inc., was founded in 1873 to manufacture electrical porcelain. It was the first to recognize in the early growth of electrical power transmission an urgent need for dependable porcelain insulators. The line established to meet that need has expanded steadily into the present one with full provision for insulator and line hardware requirements of today's high voltage transmission systems.

Now, these well-known Thomas products have been added to the comprehensive line of high voltage equipment manufactured under the Delta-Star name. At the same time, Thomas facilities have been improved and the line expanded making Delta-Star's Thomas Works a name to remember when electrical porcelains and line hardware are required.

For further information on insulators or other high voltage equipment, write today to Thomas Works, Delta-Star Electric Division, H. K. Porter Company, Inc., Lisbon, Ohio.

THOMAS WORKS

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.

Divisions of H. K. Porter Company, Inc.: Connors Steel, Delta-Star Electric, Henry Disston, Leschen Wire Rope, Quaker Rubber, Refractories, Riverside Alloy Metal, Vulcan Crucible Steel, W-S Fittings, H. K. Porter Company (Canada) Ltd.

Reach For
Test-Proven
ACCURATE TAPE
FRICTION .... RUBBER .... PLASTIC
Friction tape
Test-proven by International Testing Laboratories, Inc., for bond and tensile strength, climatic extremes, dielectric qualities, and elongation tests. Accurate exceeded all ASTM requirements. Rely on Accurate with confidence—Accurate is the choice of electrical men everywhere. Accurate Plastic Tape is Underwriters' Laboratories approved.
Send today for our most recent bulletin describing details.
ACCURATE MANUFACTURING CO.
GARFIELD, NEW JERSEY

The *Economy* lug with *Quality* improvements:

- **Insulation butts flush.**
- **Serrations give better grip.**
- **More contact area.**

7 sizes take 14 sol. to 1000 MCM. NEMA drilling. 45° or 90° tongue. Also available, multiple grip or hex-head screws.

Price is as attractive as the lug. Write for samples of sizes you use. PENN-UNION ELECTRIC CORP., Erie, Pennsylvania.

Sold by Leading Wholesalers

Write for Sample

PENN-UNION

Engineers Retained By California

The barrier against the State of California hiring private engineers finally has been cracked. Director of Public Works Frank B. Durkee announced private electrical engineers have been selected for services on five southern California projects being planned by the state division of architecture.

He noted these contracts represent the state's first new architectural and engineering contracts with private firms in several years.

Projects and electrical engineers who will perform the electrical engineering phases of the five southern California buildings are:

Engineer Henry Simmons of Long Beach, science building addition at Long Beach State College; Engineer L. R. Kelly of Los Angeles, library building addition at San Diego State College; engineering firm of Frumhoff & Cohen of Los Angeles, science building addition at San Diego State College; Engineer Michael J. Garris of Los Angeles, district VII office building addition for the division of highways in Los Angeles, and Engineer L. R. Kelly of Los Angeles, district XI office building addition for the division of highways in San Diego.

Snohomish PUD Plans Sultan River Project

The Snohomish County PUD of Everett, Wash., has instructed R. W. Beck & Associates, consulting engineers, of nearby Seattle, to prepare an application to the Federal Power Commission for a license to construct three dams on the Sultan River east of Everett, which would produce a maximum of 135,000 kw of power and supply as much as 330,000,000 gal of water daily.

Cost of the project, including power transmission lines, is estimated at $41,100,000. The city of Everett, which needs additional water supply, is expected to be a party to the project, which has been under study for several years.

PG and E Shaves Cost On McCloud-Pit Project

Pacific Gas and Electric Co. has filed an amended application with the Federal Power Commission for a license to build the $43,900,000 McCloud-Pit hydroelectric development in Shasta County, Calif.

NEWS ABOUT PEOPLE

Montana Power Company Has Executive Changes

Five new vice-presidents were elected and two others were elevated to senior vice-presidents by directors of the Montana Power Co.

The new vice presidents are: Cecil H. Kirk, in charge of electrical operations; W. W. German; L. S. Stadler, in charge of natural gas operations; Colin W. Raff, and Harry C. Donaldson, who also is treasurer of the company.

Advanced to positions of senior vice-presidents were T. L. Doran, in charge of operations, and C. J. Burns, in charge of labor relations, personnel, public relations and sales. Kirk and Stadler will be responsible to Doran and to Burns in their respective fields.

• **Three appointments** to the Public Utilities Board at Tacoma, Wash., have been approved by the City Council. John Rue, Harry Berry and James Healy will take the places of Gerrit Vander Ende, Ralph Johnstone and Thomas A. Anderson, who are leaving the board through resignation or retirement.

Hadwin

• **T. F. Hadwin,** former superintendent of substations for British Columbia Electric Co., has been promoted to manager of the Bridge River area. He is a graduate of the University of British Columbia with post-graduate training at the University of Pittsburgh. He is a member of the Northwest Electric Light & Power Assn.

proved WESIX PLAN SELLS *electric home heating for dealers*

Right now, many people in your area are planning new homes or remodeling.

We know the names and addresses of a lot of them. Because our advertising in national building publications offers a free 32-page booklet, "Design for Modern Electric Heating." We also offer free heating plans to those who receive this booklet.

In this way, we KNOW WHO are really going to build—and turn these well-developed prospects over to Wesix dealers.

You can be a Wesix dealer

Wesix dealers also receive complete sales aids for completing these sales that Wesix develops.

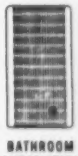
And you can be a Wesix dealer.

Get in on the ground floor of the electric heating boom in your area. Start off with our Dealer Sales Kit that includes a complete catalog, window banners, truck decal, our Wiredheat Calculator, literature, and other selling tools tailor-made to help you to a larger share of the building dollar with Wesix Wiredheat!

WALL FURNACES

BASEBOARD PANELS

WALL CONVECTORS



BATHROOM AUTOMATICS

Just phone, wire or send us an air-mail letter today.

WESIX Wiredheat AUTOMATIC ELECTRIC HEAT

WESIX ELECTRIC HEATER CO.
390 FIRST STREET • SAN FRANCISCO 5 • CALIFORNIA
Cleveland • Dallas • Denver • Huntsville, Alabama
Los Angeles • New York • Portland • Sacramento • San Diego • Seattle • Spokane

Calectric Changes Made After Cage Retirement

Carl C. Ernst, vice-president and general manager of California Electric Power Co. since 1946, has been named president of the company succeeding Albert Cage.

Ernst has been associated with Calectric for the past 37 years.

Fred Oldendorf, vice-president and assistant general manager, has been named vice-president and general manager filling the vacancy created by Ernst's appointment.

At the same time the company announced the appointment of Robert Neuman, Calectric San Bernardino district manager, to the newly created position of vice-president in charge of districts.

A native of Hulington, Ohio, Ernst attended Los Angeles Poly High and the school of electrical engineering at the University of California. He is a registered professional engineer and immediate past director of the Pacific Coast Electrical Assn. and a member of that organization for 33 years.

Cage has been president for over 11 years and has 43 years service with the company. He will retain his association with the company as a member of its board of directors and will also serve in the capacities of Calectric general consultant and president of Calectric's associated Mexican utility—Industrial Electrica Mexicana.

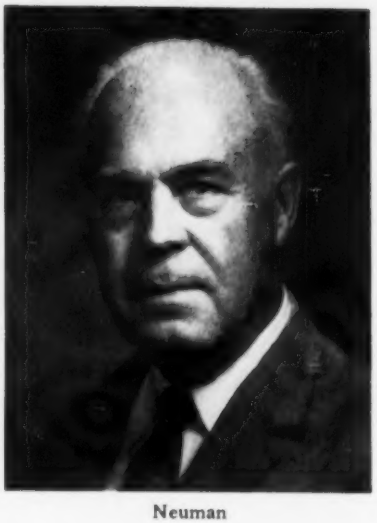
Oldendorf who assumed Ernst's position as vice-president and general manager has been associated with Calectric for the past 28 years. He was appointed vice-president and assistant general manager in 1951.

Neuman has served as superintendent and district manager in San Bernardino since 1923 and has been associated with Calectric for 38 years.

Cage

Ernst

Oldendorf



Neuman

• **Jack A. Graham** and **Charles Davies** were elected assistant secretary and assistant treasurer respectively, of San Diego Gas & Electric Co.

• **Orion Lorenzi** has been appointed secretary of the Lincoln Public Service Co. of Kemmerer, Wyo. He succeeds George Rollins, who resigned to take another position in Brigham City, Utah. Lorenzi has been employed by Lincoln Service since April 15, 1954.

• **James B. Ward,** former associate professor of electrical engineering at Purdue University, has joined Pacific Power & Light Co.'s engineering staff as research engineer. He is an authority on transmission grids and application of digital computers to power system problems. One of Ward's initial responsibilities will be to direct programming of engineering applications for PP&L's new electronic computer system.

• **Harold R. Johnson** is new chairman of the public utilities board at Tacoma. He succeeds Gerrit Vander Ende, who resigned.

• **Carl Womack,** secretary-treasurer of Northern Lights Inc., electric cooperative at Sandpoint, Idaho, has been elected president of Lewis-Clark G & T Cooperative Inc., an agency recently formed by 12 Northwest REAs to set up their own generating and transmission facilities. Other officers of the group selected at a meeting in Spokane were D. I. Hopkins, president of Inland Power & Light Co., Spokane, first vice-president; N. V. Fisher, manager of Lincoln Electric Cooperative Inc., Davenport, Wash., second vice-president, and John G. Bensel, president of Umatilla Electric Cooperative Assn., Hermiston, Ore.

• **W. D. Gill** has been appointed new superintendent of B. C. Electric Co.'s 50 mainland substations. Formerly staff engineer in the chief engineer's office of BCE, he joined the company in 1947. Two new assistant superintendents have been appointed in the distribution engineering department. They are **Allix J. Duncan** and **Herbert Sladen.** Both are graduates of University of B.C. Duncan was district distribution designer for the Fraser Valley before being posted to Vancouver in 1954 as distribution engineer. Sladen became distribution engineer in Vancouver in 1950.

GET ON THE PROFIT CIRCUIT WITH TITAN

tops in high wattage heater sales with

HI-HEAT
HI-STYLE
HI-QUALITY and low, low PRICE

new TITAN Completely Automatic HI-WATT HEATERS

Now Titan offers you three profit-proven Hi-Watt Heaters for Hi-Volume Selling. With Titan you offer your customers MORE value, MORE features, MORE heat, MORE styling, MORE efficiency . . . all for LESS money. That's why Titan is the fastest-selling line in the field. And that's why Titan offers you more profit opportunities than any other line.

TITAN PRE-SELLS YOUR CUSTOMERS with the most powerful promotional program in TITAN history. And TITAN gives you FREE ad mats, product literature, folders. STOCK . . . FEATURE . . . SELL the well promoted TITAN line.

The Only High Wattage Heaters with **ELEMENTS UNCONDITIONALLY GUARANTEED for 10 YEARS** of Trouble Free Service

Compare these Features with ANY High Wattage Heaters

- HEARTH-SIDE COMFORT FILLS ANY ROOM
- PRECISE AUTOMATIC THERMOSTAT CONTROL
- AUTOMATIC TEMPERATURE LIMIT and INSTANT, SAFETY SHUT-OFF CONTROL
- LIVE POWER SIGNAL LIGHT
- SUPER-SILENT FAN-FORCED CONVECTION HEAT
- MAXIMUM EFFICIENCY EVER-COOL CASE
- DURABLE PEARLIZED BAKED ENAMEL FINISH
- 10 YEAR ELEMENT GUARANTEE
- 1 YEAR GUARANTEE ON MATERIALS and WORKMANSHIP
- UL TESTED and LISTED

TITAN Hi-WATT HEATERS	Model 66 ...3,000 Watts Model 67 ...4,000 Watts Model 68 ...4,600 Watts	All 230 Volts, 60 Cycle, AC

Introducing

A TOTALLY NEW APPLIANCE

TITAN HI-V Convertible

HEATS in Winter . . .
COOLS in Summer

Write for further information on the TITAN CONVERTIBLE and the rest of the fast-selling TITAN Line.

TITAN SALES CORPORATION • BUFFALO 10, N. Y.

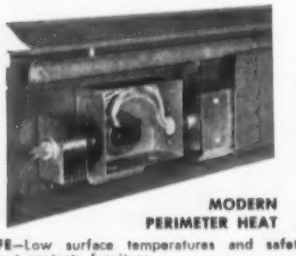
BURNDY
Crimpit
COMPRESSION
CONNECTORS

for all copper
and aluminum
service connections

GEO. E. HONN CO.
420 Market Street
San Francisco, Calif.
SUtter 1-7352

HEATSUM
ELECTRIC
BASEBOARD

(Illustration of cut-a-way section)



MODERN
PERIMETER HEAT

SAFE—Low surface temperatures and safety cutout protects furniture.
2-HEAT, AUTOMATIC CONTROL — thermostat switches from high to ½ heat automatically. (Normally operates on ½ heat.)
HIGH CAPACITY—3000 watts in 8-foot unit on high heat. Less WALL SPACE required.
BASEBOARD UNITS—available in many lengths and watteges. They are designed for a completely harmonized installation in any room. Units may be joined; blank sections available for extensions.
EASY TO INSTALL—Units attach to wall surface in new or existing buildings.
All Baseboard units have two elements and can be used with our No. 332 Thermostat for 2-heat control.

Send for free folder

ROBERSON Inc.
1539 East 103rd St., Seattle 55, Wash.

NOTES ON THE TRADE

• **Jim Shirreffs Co.**, Los Angeles electrical manufacturers' representative, should be in new quarters as you read this. **Jim Shirreffs Jr.** purchased what was known as Plant No. 2 of S&M Lamp Co. at 3601 S. Broadway Pl., Los Angeles 7. The new quarters will be heated and lighted with products handled by the firm. If the move goes through on schedule, it will occur on about the 48th anniversary of **Jim Shirreffs'** entry into the electrical industry—Aug. 9, 1909.

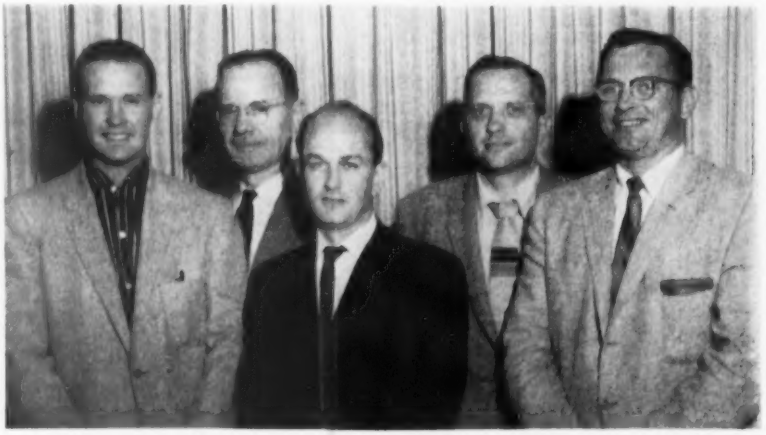
• A new $1,500,000 plant will be built this year for **Western Wire & Cable Co.** Ltd. as the first factory on a new industrial estate being developed at Langley, in the Fraser Valley, 30 miles from Vancouver, B. C. The new factory will occupy 26 acres in the 100-acre estate, which is being patterned after the Annacis Island project in New Westminster.

• **R T & E Corporation** has announced that **Loren D. Barre** has been assigned to the position of assistant to the vice-president. Barre was formerly sales representative for R T & E in the state of Washington. **Howard A. Dunn** has been assigned to replace Barre in the Washington area. Mr. Dunn is a graduate of Oregon State College and was formerly employed by a large equipment manufacturer before joining R T & E.

Stephens

• **Edward J. Stephens** has recently been appointed district manager of the **Okonite Co.**'s San Francisco territory, covering the northern areas of California and Nevada. His headquarters will be the wire and cable company's San Francisco office-warehouse at 701 Phelps St. In addition, he will supervise the activities of the Portland and Seattle offices. Stephens succeeds I. W. Borda, recently appointed vice-president and general sales manager, and who will be located at Okonite's executive offices in Passaic, N.J.

• **Swivelier Co. Inc.** announced the appointment of Barney Hartley as sales representative in Arizona with headquarters at Phoenix.



Attending the general sales conference of Holophane Co. at Bear Mountain Inn, N. Y., were these Westerners: H. E. Gypson, district manager, Denver; R. G. Dummel, district manager, San Francisco; Joe Platt, district engineer, Los Angeles; Paul Davis, district manager, Seattle; and J. J. McCullough, sales engineer, San Francisco. The program included sales analysis sessions and product seminars

(Advertisement)

Lighting Equipment Market In West Is $68,145,000

Annual sales of 10 types of lighting equipment in the Western States are estimated through 1962 in ELECTRICAL WEST's latest Product Market Study. In all, 105 products representing $775,576,000 annual purchases by the Western electric power industry are covered. Copies available from ELECTRICAL WEST, 68 Post Street, San Francisco 4, California. If you sell industrial products you should advertise to this market.

(Advertisement)

West Uses $123,220,000 Worth of Wire and Cable

Annual Sales of 11 types of insulated wire and cable and utility conductors are the largest of any category reported in ELECTRICAL WEST's latest Product Market Study. In all, 105 products representing $775,576,000 annual purchases by the Western electric power industry are covered. Copies available from ELECTRICAL WEST, 68 Post Street, San Francisco 4, California. If you sell industrial products you should advertise to this market.

HOW TO ESTIMATE THE COST of any electrical job

This book is packed with time-saving methods that help you streamline your estimating procedures—give you the knowledge that means safer and more dependable bids. Covers everything from the selection and training of electrical estimators and the proper use of estimating tools to preparation of final bid sheets.

ELECTRICAL ESTIMATING

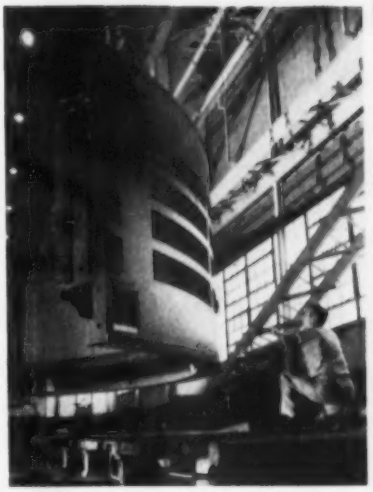
By Ray Ashley
Member, Chicago Electrical Estimators' Assn.
2nd Ed. 363 pages, illustrated. $8.00

Covers . . .
- estimating forms
- estimating tools and their proper use
- studying plans and specifications
- taking off quantities
- listing and checking material quantities
- checking completed estimates
- and many other practical subjects

CLEAR explanations, plus sample estimates and guides, show you how to handle lighting and power branch wiring—distribution equipment—overhead and markups—estimating special projects and residential wiring. Time studies and preparation of labor cost units are examined in detail.

SEE THIS BOOK 10 DAYS FREE
McGraw-Hill Book Co., Inc. Dep't FWest 8/57
327 W. 41st St., New York 36
Send me Ashley's **Electrical Estimating** for 10 days' examination on approval. In 10 days I will remit $8.00, plus few cents delivery costs, or return book postpaid. (We pay delivery costs if you remit with this coupon; same return privilege.)

Name .....
Address .....
City ..... Zone ..... State .....
Company .....
Position .....
(For prices outside the U.S., write to McGraw-Hill Int'l, New York 36) FWest 8/57



Bound for Idaho Power Co.'s Brownlee project at Robinette, Ore., this 50-ton section of a waterwheel generator stator is shown being loaded aboard a flatcar at the Westinghouse East Pittsburgh plant. This stator section, when coupled with two identical units in a circular arrangement, will form the complete stator for the generator.

- **A new warehouse,** distribution and office center—described as "one of the most modern facilities of its kind"—was "unveiled" recently by General Electric's Lamp Division in the Vail Field area of Los Angeles. The 117,300-sq-ft single-story, reinforced concrete structure is located on a six-acre site at the corner of Malt Ave. and Telegraph Road adjacent to the Santa Ana Freeway less than eight miles from downtown Los Angeles. Official address is 2747 South Malt Ave.

- **Robert O. Gray** has been named as a member of the board of directors of California Electric Works, a San Diego firm offering a wide variety of electrical services. Gray is manager of the estimating and design departments and has been with the company 10 years.

- **J. T. Jackman Jr.,** specialist in power plant design and engineering, has joined Kaiser Engineers. Jackman comes to Kaiser Engineers with more than 26 years of previous experience in the engineering and design of utility and industrial power plants and allied fields.

- **Stusser Electric Co.,** wholesale electrical firm of Seattle, has announced plans to open a second branch operation, in Mount Vernon, north of Seattle. Its first branch is in Yakima, in eastern Washington.

your industry's BIGGEST TRADE SHOW!

Your industry's biggest trade show isn't a once-a-year event. It comes to you with *every single issue* of this magazine. And, because it is scheduled so frequently, it can bring you a continuing series of up-to-the-minute "displays." In these advertising pages, you will find the latest news about products and services that are specially designed to help you do your job better, quicker, and cheaper. To be well-informed about the latest developments in *your* industry . . . and to stay well-informed . . . *read all the ads too.*

McGRAW-HILL PUBLICATIONS

EARL S.
Condon COMPANY
Engineering Representatives

- Burndy Corp.
- Carma Manufacturing Co.
- Lepp Insulator Co.
- P-W Industries, Inc.
- U.S. Rubber Co., USKON Division
- Preformed Line Prod. Co.
- Southern Car & Mfg. Co.
- Kaiser Aluminum & Chemical Sales, Inc., Insulated Wire & Cable Dept.
- Standard Electrical Products Company

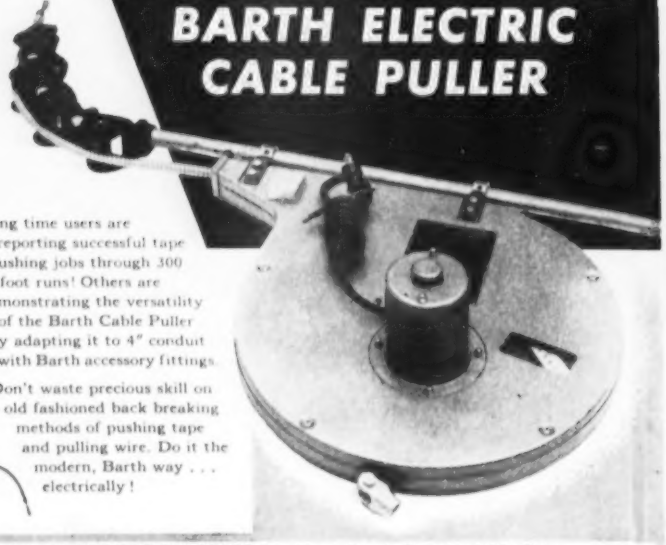
3460 WILSHIRE BLVD. • LOS ANGELES 5, CALIF.

DU 1-3951 • TWX: LA-795

Gaer

• **Glenn Gaer** will cover the states of Colorado, New Mexico and Wyoming as sales representative for Swivelier Co. Inc. Gaer is president of the Rocky Mountain Electrical Manufacturers Representatives Club and past chairman of the Rocky Mountain Section of the Illuminating Engineering Society. He is also active in the Denver Rocky Mountain Electric League.

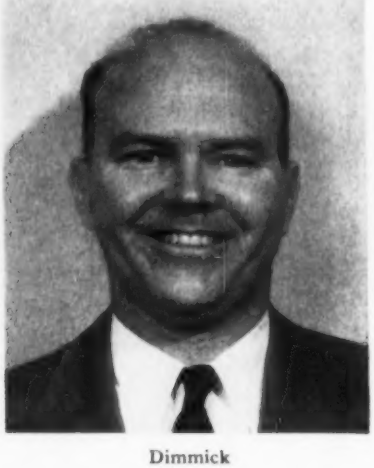
NOW·· SUCCESSFUL CONTRACTORS EVERYWHERE
CHANGE HOURS OF TAPE PUSHING—CABLE PULLING TOIL TO MERE MINUTES OF QUICK WORK WITH THE
BARTH ELECTRIC CABLE PULLER



Long time users are reporting successful tape pushing jobs through 300 foot runs! Others are demonstrating the versatility of the Barth Cable Puller by adapting it to 4" conduit with Barth accessory fittings.

Don't waste precious skill on old fashioned back breaking methods of pushing tape and pulling wire. Do it the modern, Barth way . . . electrically!

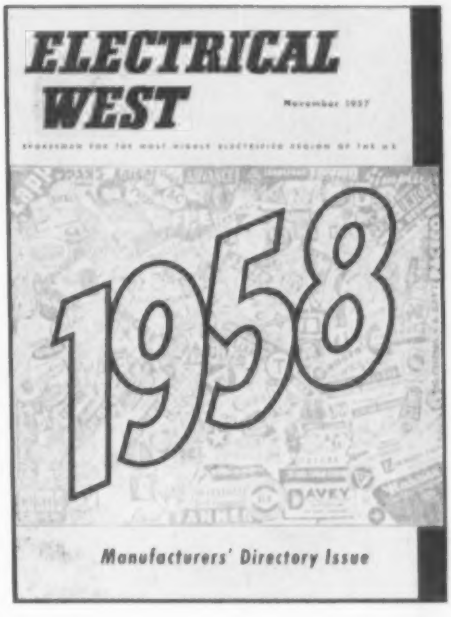
THE BARTH CORPORATION, 12655 Brookpark Road, Cleveland 30, Ohio
Please send complete Cable Puller Data Folder and prices
NAME ..... YOUR COMPANY .....
ADDRESS .....
CITY ..... ZONE ..... STATE .....



Dimmick

• **Walter F. Dimmick** has been named executive vice-president of Hill Transformer Company Inc., San Carlos, Calif., with primary responsibility for the financial and marketing activities of the transformer manufacturer.

• **E. E. Leavy** has been named assistant district manager at Los Angeles for Graybar Electric Co. He moved from St. Louis.



. . . Spokesman for the ELECTRICAL Industry in the WEST

Announces . . .

The 25th Annual MANUFACTURERS' DIRECTORY

Directory of MANUFACTURERS

Directory of Appliance Service and Repair Parts

Directory of REPRESENTATIVES

WHERE-TO-BUY Product List
(This Section Lists ELECTRICAL WEST Advertisers Only)

BUYERS' GUIDE & DIRECTORY lists manufacturers of electrical equipment, appliances and supplies, their Western offices and their Western representatives. *OVER* 2,000 *manufacturers are listed.*

Buyers, specifiers and users of electrical equipment in the West have come to depend on this annual service of ELECTRICAL WEST. The 1958 edition will contain additional features that will make it more useful than ever to more than 12,000 subscribers. REMEMBER

LOOK IT UP FIRST

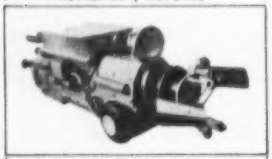
in the Buyers' Guide & Directory

1958 Edition coming in November

there's a better way to get it done!

For Dependable Pipe Line Service Call in the Specialists!

Centrifugally applied and mechanically trowelled



Compact, mobile machine moves through the line

Centriline Process applies smooth, continuous leak-proof lining to inside of 16" to 144" pipe lines "in place." Applicable to fresh or salt water, oil, gas or industrial waste lines. Eliminates interior corrosion and leakage. Restores full flow coefficients.

Write for full information TODAY!

Specializing in Pipe Protection Problems
• Tate and Centriline "In Place" Interior Cement Mortar Lining • "In Plant" and "Railhead" Centrifugal Spinning of Cement Mortar or Coal Tar Linings – Somastic® Exterior Coating • Pipe Wrapping • Reclamation: Removal of Old Wrapping, Straightening, Blasting, Beveling, Testing.

PIPE LININGS Inc.
2414 East 223 St. (P. O. Box 457)
Wilmington, California

"But you can't buy that kind of a motor..."

How many times have you heard somebody that ought to know better say something like that about motors, pumps, compressors or what-have-you? And how many times you heard somebody else say, "Oh yes you can! I saw just what we need in Blank Company's ad yesterday."
Advertising pages in this magazine are packed with *news* about your business. They contain information about products and services designed to help *you* do your job quicker, better and cheaper.
To be well-informed about the latest developments in *your* business, *your* industry . . . and to stay well-informed . . . *read all the ads too.*

McGRAW-HILL PUBLICATIONS

Westinghouse Announces West Coast Appointments

Westinghouse Electric Corp. has announced several staff changes on the West Coast.

With the addition of a new sales district in the Los Angeles area comes the appointment of Willard C. Hird to head it up. Raymond K. Leonard retains managership of the southern half of the divided district.

Hugh E. Day has been named manager of a new apparatus office at Arcadia, Calif.

At Sunnyvale, Lawrence D. Gibson becomes industrial relations manager, a job that includes responsibilities in five other Western plants.

Leo A. Hansen Jr. has been named assistant to the sales manager of the Pacific Coast region of the Westinghouse Lamp Division. He headquarters at Emeryville.

• **Clifford Malm** has been assigned a field engineering position by Line Material Industries' sales organization. He will headquarter in Anchorage, to represent L-M in all of Alaska north of Juneau. A native of Omaha, Neb., Malm attended college at University of Omaha and University of Washington. He received his electrical engineering degree early in 1957. Malm's experience in electric distribution includes engineering jobs with Nebraska and Seattle utilities.

• **Marshall R. Elmore** & Co. will now handle the Circle F line of wiring devices in the states of Arizona and New Mexico and the West Texas (El Paso) area. Headquarters for the Elmore firm are 605 Mills Bldg., El Paso, Tex.

• **Jack Payne** Co. of Los Angeles has recently been appointed manufacturer's representative for Emerson Payne Co. of Pomona, Calif., manufacturer of a line of exhaust fans and recessed lighting fixtures; and also for Cavalier Corp. of Chattanooga, Tenn., who makes a line of electrical heaters. It will represent Cavalier in the Los Angeles areas, Imperial Valley, San Diego, and Arizona.

• **Louis C. Jukich** of General Electric Co., formerly local credit manager for the Apparatus Sales Division, has been named manager of credit and collections for the apparatus sales division in the Pacific district, comprising California, Oregon, Washington, Arizona and parts of Idaho and Nevada.

Gibson

Hansen

• **Alfred T. Krook,** former vice-president of Stone & Webster Engineering Corp. and president of its Canadian counterpart, has joined Bechtel Corp., San Francisco, as a vice-president. He also will hold the title of vice-president in Bechtel International Corp. and Canadian Bechtel Ltd. He will be responsible chiefly for the U. S. Northwest and western Canada. Krook, a veteran engineer in the petroleum, pipeline and power fields, was vice-president and general manager of Engineering Management Inc., San Francisco, before joining Bechtel.

• **G. O. Toms Electric Co.,** Spokane, was appointed a Century Electric Co. distributor in June. It will handle Century's complete line of motors and generators.

SURGICAL LINE CLEARANCE BY DAVEY

Davey is doing line clearing for 12 Public Utilities on the Pacific Coast —most of them served continuously for over 20 years. Davey specialized equipment and efficient methods save money . . . Davey surgical pruning benefits trees—builds goodwill.

DAVEY LINE CLEARING
DIVISION OF
DAVEY TREE SURGERY CO., LTD. OF CALIFORNIA
Russ Bldg., San Francisco, SUtter 1-3377
Story Bldg., Los Angeles, TUcker 1929

REPRESENTATIVES WANTED

Nationally known transformer manufacturer desires sales representatives in the San Francisco area; also in the San Diego area. Write Electrical West, Box 293, San Francisco 4, Calif.

(Advertisement)

Western Utility Communication Systems Cost $5,380,000 a Year

Western power systems are using more and more microwave equipment each year. Expenditures for several types of communication equipment are detailed in ELECTRICAL WEST's latest Product Market Study. In all, 105 products representing $775,576,000 annual purchases by the Western electric power industry are covered. Copies available from ELECTRICAL WEST, 68 Post Street, San Francisco 4, California. If you sell industrial products you should advertise to this market.

INDEX TO ADVERTISERS
August 1957

Accurate Mfg. Co. 158
Advance Transformer Co. 80
Allis-Chalmers Mfg. Co. 13, 53, 54, 55, 56, 91, 133
Aluminum Co. of America 50, 51
American Steel & Wire Div. 42, 43
American Tel & Tel 26
Anderson Electric Corp. 20

Barth Corp. 164
Bechtel Corp. 84
Blackburn Corp., Jaspar 87
Briegel Method Tool Co. 77
BullDog Electric Products Co. 29
Burndy Corp. 37

Carol Cable Co., Div. Crescent Co., Inc. 9
Chance Co., A. B. 58
Circle F Mfg. Co. 154
Classified 167
Condon Co., Earl S. 164

Davey Tree Surgery 167
Day-Brite Lighting, Inc. 52
Delta-Star Electric Div., H. K. Porter Co., Inc. 136
Driver-Harris Co. 59

Electrical West 165
Electro-Motive Div., General Motors Corp. 82, 83
Electro Technical Div., Sun Chemical Corp. 11
Estimatic Corp. 12
Everstick Anchor 142

Fanner Mfg. Co. 25

Gedney Electric Co. 14
General Electric Co.
Schenectady, Apparatus Div. 10, 38, 39, 94, 139
Graybar Electric Co. 72

Holophane Co., Inc. 132
Honn Co., George E. 162
Hubbard & Co. 89

Indiana Steel & Wire Co. Inc. 142
I-T-E Circuit Breaker Co. 150

Johns-Manville 44
Jones Metal Products, Abolite Lighting Div. 163

Kearney Corp., James R. 64
Kerite Co. 65
KPF Electric Co. 164
Kuhlman Electric Co. 141

Leadlight Fixture Co. 156
Line Material Industries 3

McGraw-Hill Book Co. 31, 166
Meter Devices Co. 167

Ohio Brass Co. 41
Okonite Co. 69
OZ Electrical Mfg. Co. 48

Peterson Engineering Co. 62, 63
Pacific Coast Electrical Assn. 4th Cover
Pacific Gas and Electric Co. 3rd Cover
Paranite Wire & Cable Div. Essex Wire Corp. 57
Pennsylvania Transformer Co. 70, 71
Penn-Union Electric Corp. 158
Pipe Linings, Inc. 166
Porcelain Products, Inc. 16
Preformed Line Products Co. 23
Prodelin, Inc. 143
Pyramid Instrument Corp. 129

Remcon 129
Reynolds Metals Co. 78, 79
Roberson, Inc. 162
Roebling's Sons Co., John A. 134, 135
Rome Cable Corp. 7
R T & E Corp. 17

Sangamo Electric Co. 148, 149
Shell Oil Co. 88
Simplex Wire & Cable Co. 45
Smoot-Holman Co. 1
Southern California Edison Co. 2nd Cover
Southern States Equipment Corp. 81
Spang-Chalfant Div., National Supply Co. 19
Standard Oil Co. of Calif. 32
Sun Chemical Corp. 11

Thermador Elec'l. Mfg. Co., Div. of Norris-Thermador Corp. 155
Thomas Works, Delta-Star Electric Div., H. K. Porter Co. Inc. 157
Titan Sales Corp. 161
Tri-State Supply Corp. 24

U. S. Steel Corp. 42, 43

Wagner Electric Corp. 60, 61
Wesix Electric Heater Co. 159
Westinghouse Electric Corp. 4, 5, 30, 46, 47, 66, 67, 73, 74, 75, 76, 88, 89, 130, 131, 153

Youngstown Sheet & Tube Co. 40

PROFILES

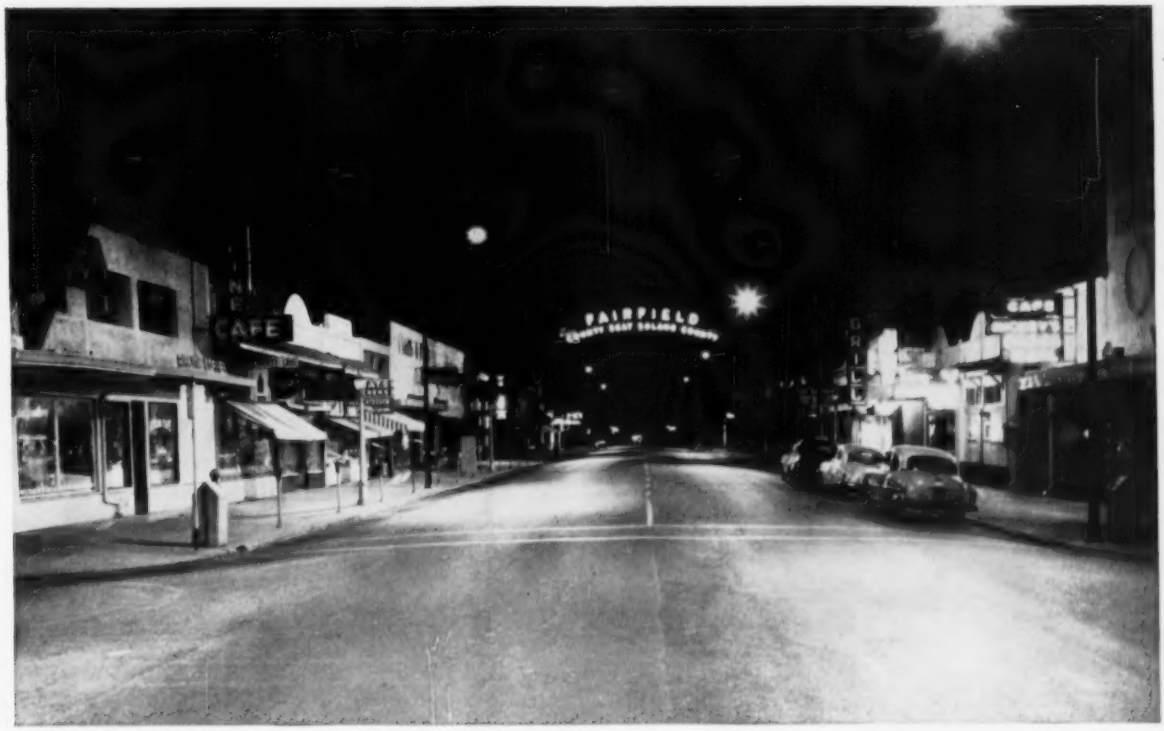
E. J. Dymek, right, has been made general merchandising manager for Sues, Young & Brown of Los Angeles. He started with the distributor more than 10 years ago and was at one time appliance division manager. More recently, however, he has been Zenith radio and TV manager, a position he still holds.

Below: Charles Ward of San Jose, Calif., receives tickets for a week end in New York from John F. Myers, left, president of Westinghouse Electric Supply Co. Harold J. Lutton, general sales manager, the apparatus and supply division, joins in congratulating him on election as division national champion of Wesco salesmen

These whiskers weren't grown for the annual Western barbecue of the Santa Clara-San Benito Chapter, NECA, in San Jose. They were manufactured by Ray Anson, switchboard manufacturer with theatrical talent unknown 'til then. They are Chester Hershey of Guilbert Electric, Paul Leslie of All-Cal Electric, chapter president, and Jim Roberts of joint apprenticeship board

Every citizen benefits from modern street lighting

Fairfield, California, once had street lighting problems. Then the city adopted a master street lighting plan. In a short time, Fairfield became a better place to live. Our lighting engineers can show your community, too, how to brighten dangerous and outdated street lighting.



"Fairfield is definitely a safer place to live since our mercury lamps were installed," says Police Chief Rex Clift. "Good street lighting aids law enforcement by discouraging crime and is a big help in reducing traffic mishaps."

"It helps business and boosts civic pride," claims Dr. Charles Wilson, President of Fairfield's Chamber of Commerce. "Modern street lighting stimulates evening shopping . . . all our main street businessmen have benefited."

"Better place to raise families," says Mrs. Ruth Hagemann, a PTA Committee Chairman. "When the youngsters want to go downtown for a show or refreshments, the security of well lighted streets helps parents rest easier."

For a free lighting survey, contact your local P. G. and E. office

P·G and E·

Pacific Gas and Electric Company

Yerk

A yerk is not a Scandinavian "square." It is a verb, meaning to think hard or to work hard. Most of us have to yerk all the time. A few seem to avoid yerking at all times. Unless you're married to the boss's daughter, however, you've probably yerked and yerked to get where you are.

That's why the electric industry's national "Live Better . . . Electrically," and "Full HOUSEPOWER" programs should interest you. A lot of smart people spent a lot of time and money yerking to create these two campaigns so that *you* wouldn't have to yerk as much.

If you're not featuring these proven-successful programs in your advertising and sales promotion, you're yerking too much!

For complete details on either promotion, as well as other PCEA activities, drop in or write to either of our offices.

PACIFIC COAST ELECTRICAL ASSOCIATION

530 West Sixth Street, Los Angeles 14, California • 681 Market Street, San Francisco 5, California